MODEL AIRPLANE NEWS

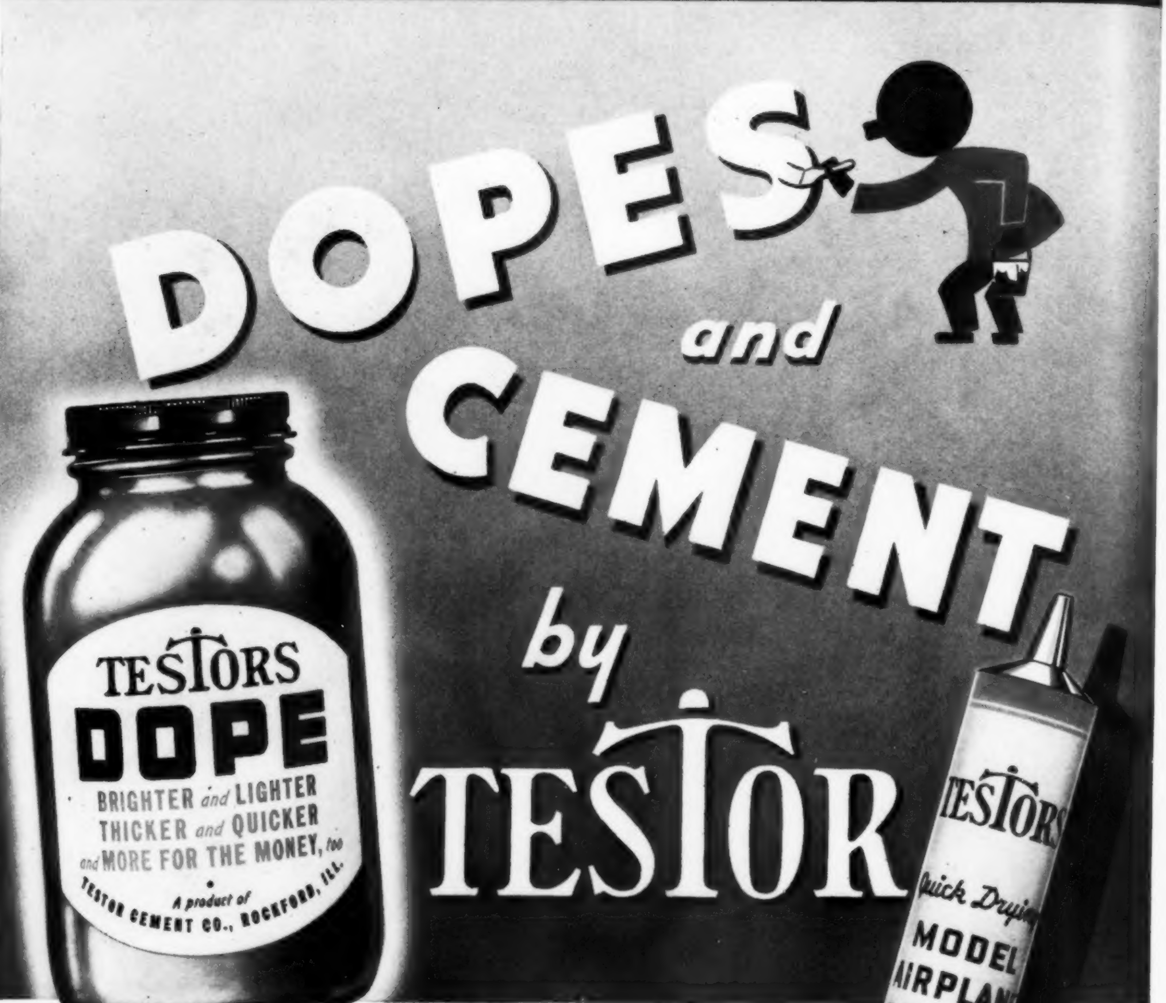
[illegible]th Year of Publication

DECEMBER, 1940

20c

Grumman G36-A Fighter

HIGHEST QUALITY... MORE-FOR-YOUR-MONEY



DOPES SELL IN HANDY CLEAR-GLASS BOTTLES FOR

1/4 PINT	20¢
1/2 PINT	35¢
1 PINT	60¢
1 QUART	$1.00
1 GALLON	$3.00

(ALSO IN 5c & 10c BOTTLES)

NEVER BEFORE A LINE LIKE THIS!

Dopes by Testor . . . packaged in big, handy, clear-glass bottles . . . have tremendous covering power, true colors and brilliant gloss, no blushing, firm but flexible "draw", a smooth finished surface, light weight. The complete line includes clear dope, colored dopes in a full range of colors, banana liquid, thinner. Testor's Model Airplane Cements . . . including Formula M-77 developed especially for gas models . . . are quick drying, strong and tough, crystal clear, light in weight. Insist upon TESTOR'S *by name!* At dealers everywhere . . .

BIG, NEW DOUBLE-SIZE TUBE

5¢

(Holds 1 Full Oz.)
SHOWN ACTUAL SIZE

TESTOR CEMENT CO., *"The House of Adhesives"*, **ROCKFORD, ILL.**
World's Largest Manufacturers of Model Airplane Chemicals

for Only **$1.50**

FOR XMAS

THE GIFT THAT KEEPS ON GIVING

An engine is the finest gift a model builder can receive, BUT . . . his pleasure in receiving it and his satisfaction in its operation for months to come depend on its quality of construction and its ability to perform under the most exacting conditions. SUPER-CYCLONE is the world's finest and most complete engine, with more outstanding engineering features than any other on the market. The "G" SERIES Airplane Engine and the "G-R" SERIES Race Car and Speed Boat Engine are adaptations of the same great engine—each properly engineered to give peak performance in its respective field—both are the ultimate in precision construction. SUPER-CYCLONE performance in winning eight major airplane meets in all parts of the country is detailed on the opposite page to PROVE superiority over the strongest competition. Race Car performance is the final test of design and stamina, and on the nation's most famous tracks SUPER-CYCLONE stamina withstands the gruelling punishment of high R.P.M. . . . ASK ANY 'CYCLONE OWNER!

And Talk About Speed!—At Santa Barbara on October 14, Frank H. (Cyclone) Lair made seven successive runs at more than 73 M.P.H. with his SUPER-CYCLONE powered car, THREE of these runs being timed at 12 seconds flat or 75.0 M.P.H., EQUALING THE WORLD'S RECORD FOR THE QUARTER MILE!

THE "G-R" SERIES
10 c. c. RACE CAR ENGINE
SINGLE IGNITION

$14

We introduced the hollow rotary crankshaft principle to the miniature field and have brought it to its peak efficiency in SUPER-CYCLONE. We introduced the dual ignition system, with its more rapid and complete combustion, greater power and easier starting. The ignition system is an adaptation of the principle used in millions of the finest automobiles. It has always been one of our precision shop practices to manufacture pistons and cylinders as individually lapped units. Our aluminum die castings are the finest the world produces.

Special Attention . . . You Class "B" Model Builders!

Enjoy new thrills of flying a Class "C" ship powered with SUPER-CYCLONE! The U. S. Army trains its flying cadets in low-powered trainers, then graduates them to high-powered, high-performance planes. You, too, can graduate yourself from low-powered Class "A" or "B" into high-powered Class "C" with a SUPER-CYCLONE . . . and once you experience the outstanding performance of SUPER-CYCLONE, you will never drop back to low-power. SUPER-CYCLONE weighs but 7½ oz. bare and develops more thrust than other heavy Class "C" engines.

COMPLETE AND READY TO INSTALL—There are no extras to buy. TYPE: Two stroke cycle. Two port rotary admission valve. Transfer integral with cylinder. Every engine thoroughly tested and given full throttle run. "G-R" SERIES RACE CAR ENGINE: Complete and assembled with flywheel, dural connecting rod, spark coil, condenser and metal fuel tank. Bore 29/32", stroke 15/16". Displacement 10 c.c. "G" SERIES AIRPLANE ENGINE: Complete and assembled with spark coil, condenser, transparent fuel tank and engine mounts. 1/5 to 1/4 h.p. Bore 15/16", stroke 15/16". Displacement .647 cu. in. Weight bare 7½ oz.

Mail This Handy Order Blank Today to Insure Prompt Delivery Before the Holiday Rush!

ORDER BLANK

AIRCRAFT INDUSTRIES CORP.
GRAND CENTRAL AIR TERMINAL, GLENDALE (Los Angeles) CALIFORNIA
Home of the Famous Curtiss-Wright Technical Institute
Please send me the items checked. I enclose POST OFFICE MONEY ORDER.

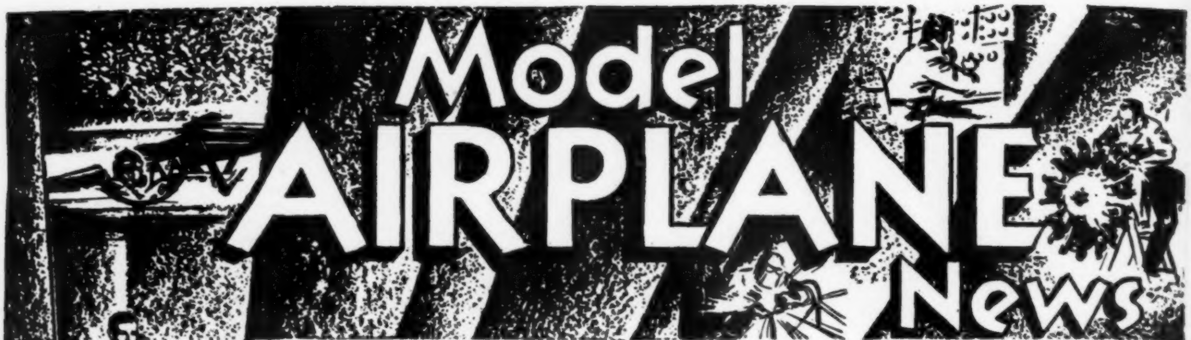
SUPER-CYCLONE "G" SERIES
Fully assembled as described above

☐ Upright—Single Ignition $13.00
☐ Upright—Dual Ignition $15.00
☐ Inverted—Single Ignition $13.50
☐ Inverted—Dual Ignition $15.50

SUPER-CYCLONE "G-R" SERIES
Fully assembled as described above

☐ Single Ignition $14.00
☐ Dual Ignition $16.00
☐ BABY CYCLONE — America's most popular engine for sport flying $9.00
Price will advance shortly to $12.50
PROPELLERS—finest quality obtainable . . 75c
☐ 14" ☐ 13" ☐ 12"
☐ Steel Mounting Brackets 50c
ALL POSTAGE PREPAID IN U.S.A.

Ship To________ Age________ Address________ MA-12



12th YEAR OF PUBLICATION

VOL. XXIII *No. 6*

Edited by Charles Hampson Grant

CONTENTS

DECEMBER, 1940

Published Monthly by JAY PUBLISHING CORP., Mount Morris, Illinois.
Editorial and General Offices, 551 Fifth Avenue, New York City.
George C. Johnson, President Jay P. Cleveland, Advertising Manager
551 Fifth Avenue, New York, N.Y.
Entered as second-class matter Dec. 6, 1934, at the post office at Mount Morris, Ill., under the act of March 3, 1879. Additional entry at New York, N. Y.

Price 20c a copy. Subscription price $2 a year in the United States and its possessions; also Canada, Cuba, Mexico, Panama and South America. All other countries $2.50 per year.
Contributors are especially advised to be sure to retain copies of their contributions, otherwise they are taking unnecessary risk. Every possible effort will be made in our organization to return unavailable manuscripts, photographs and drawings (if accompanied by postage), but we will not be responsible for any loss of such matter contributed.

[PRINTED IN U.S.A.]

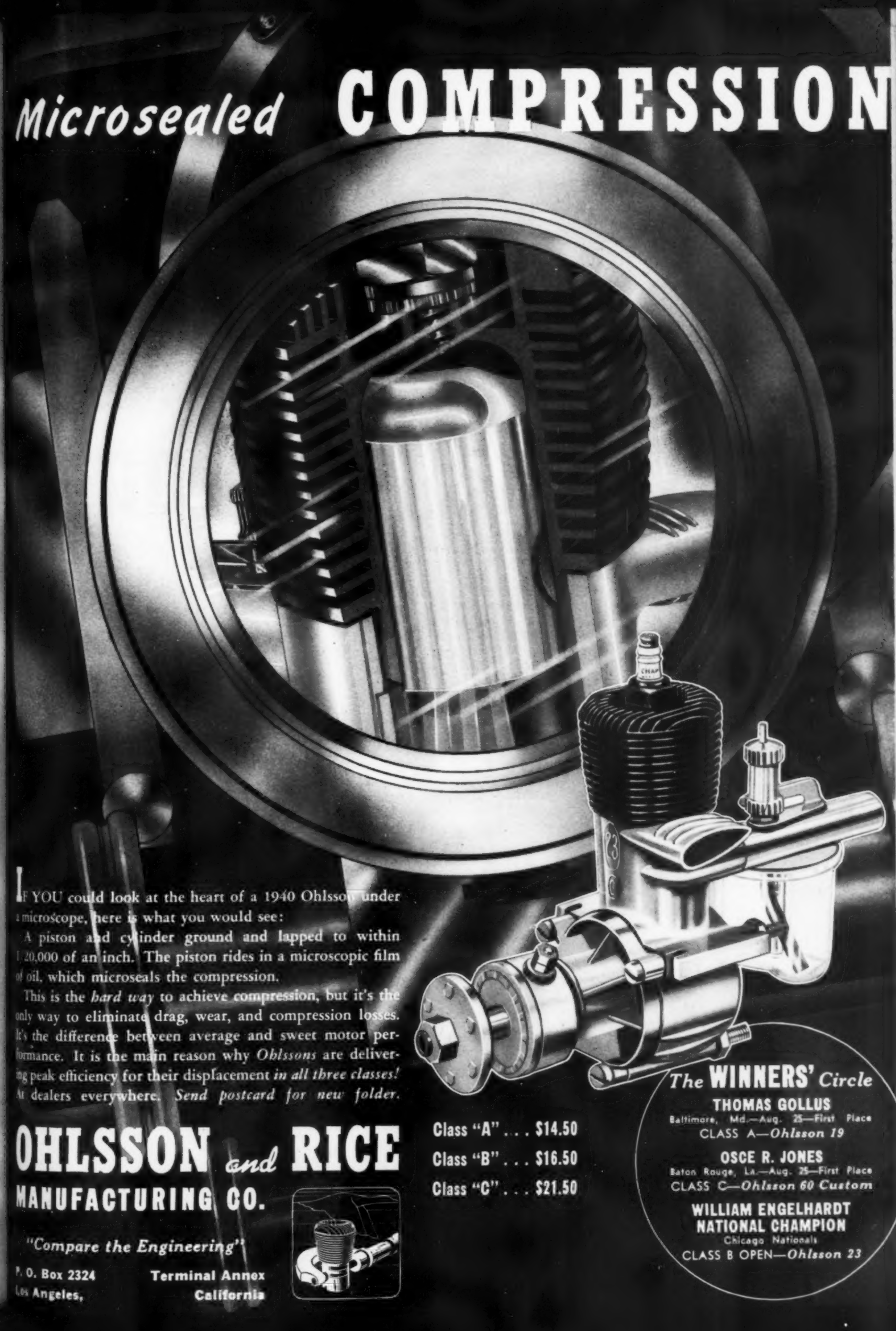
Without cost or obligation send me full information and catalog on the course checked below.

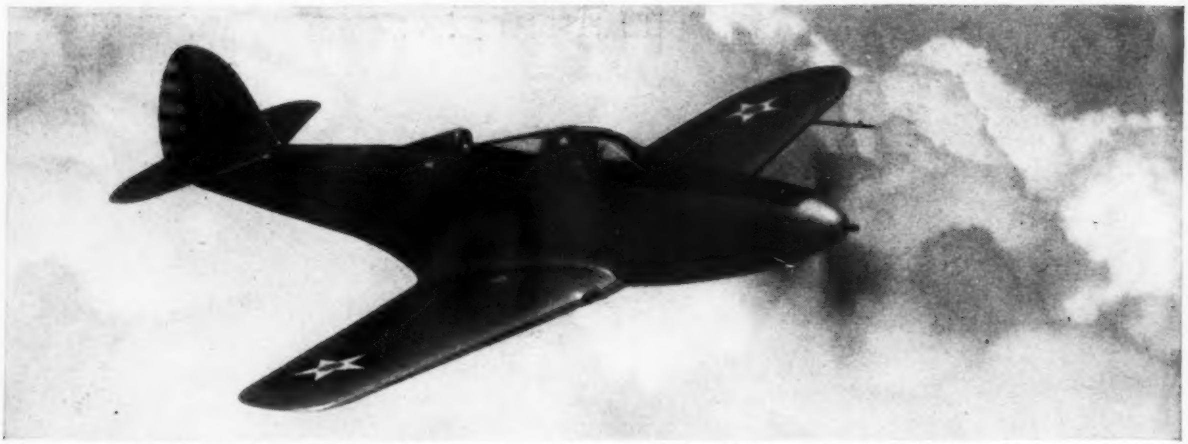
- ☆ **AERONAUTICAL ENGINEERING — MAJOR CAREER COURSE (14 MONTHS)**
  - ☆ Post Graduate Aeronautical Engineering Course (8½ months)
  - ☆ Aeronautical Drafting Course, home study (4 months)
- ☆ **MASTER AVIATION MECHANIC—MAJOR CAREER COURSE (1 YEAR)**
  - ☆ Specialized Aircraft Engine Course (8 months)
  - ☆ Specialized Aircraft Sheet Metal Course (3¼ months)
  - ☆ Specialized Airplane Manufacturing & Maintenance Course (8 months)
  - ☆ Aircraft Blue Print Reading Course, home study (4 months)

N-12

NAME ______________________ ADDRESS ______________________

Use this handy Coupon TODAY!


Microsealed COMPRESSION
IF YOU could look at the heart of a 1940 Ohlsson under a microscope, here is what you would see:
A piston and cylinder ground and lapped to within 1/20,000 of an inch. The piston rides in a microscopic film of oil, which microseals the compression.
This is the *hard way* to achieve compression, but it's the only way to eliminate drag, wear, and compression losses. It's the difference between average and sweet motor performance. It is the main reason why *Ohlssons* are delivering peak efficiency for their displacement *in all three classes!* At dealers everywhere. *Send postcard for new folder.*
OHLSSON and RICE
MANUFACTURING CO.
"Compare the Engineering"
P. O. Box 2324 Terminal Annex
Los Angeles, California
Class "A" . . . $14.50
Class "B" . . . $16.50
Class "C" . . . $21.50
The WINNERS' Circle
THOMAS GOLLUS
Baltimore, Md.—Aug. 25—First Place
CLASS A—Ohlsson 19
OSCE R. JONES
Baton Rouge, La.—Aug. 25—First Place
CLASS C—Ohlsson 60 Custom
WILLIAM ENGELHARDT
NATIONAL CHAMPION
Chicago Nationals
CLASS B OPEN—Ohlsson 23



The 400 m.p.h. army Bell P-39 has a motor over the wing like the old Farman, Curtiss and Wright planes

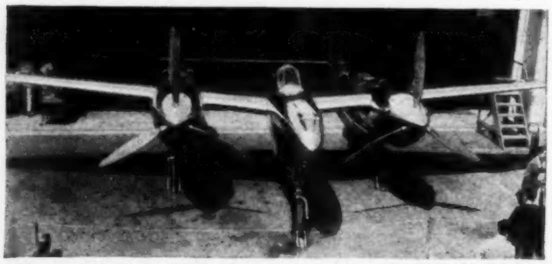
NEW Planes From

By LELAND DAYTON

"THERE'S one angle you fellows forget," remarked one of the army's crack test pilots addressing a group of reporters recently, "you forget these new planes aren't really new at all—they're just better than the old ones. Take a look at some of the old features that our planes today incorporate and you'll see what I mean."

It may not reflect any too well on present day designers, but the words of that test pilot are absolute truth. This is definitely the age of "steals"; practically all of the modern streamline features that make planes fly faster, farther and higher than ever before, were conceived and tried out by the "early birds."

Uncle Sam's new Bell "Airacobra," the XP-39A pursuit plane, is a good example. Reportedly the fastest plane in its class in the world (top speed in excess of 400 m.p.h.) the Bell pursuit incorporates a tricycle landing gear, cannon armament, centralized motor placement, an in-line motor and a retractable undercarriage, all of which were used on some of the earliest of planes.



The Lockheed pursuit has a tricycle landing gear like first Curtiss planes; twin rudders and opposite-rotating propellers like 1908 Wright planes. Only construction has changed. (Acme)

Most unique feature of the XP-39A is the placement of its motor in the center of the fuselage, driving the propeller by means of a long shaft which runs beneath the pilot's compartment to the nose of the ship. Placing the motor in this position, according to aeronautical experts, gives the plane better maneuverability.

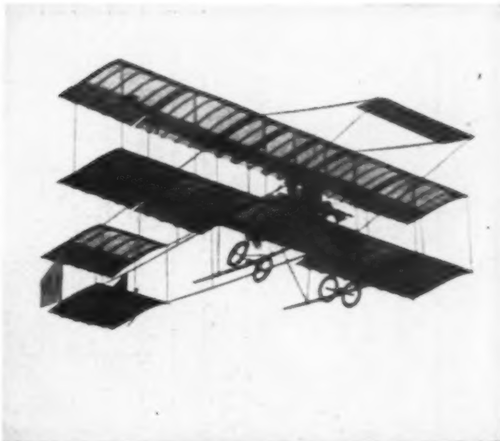
That was the same idea one army officer had back in 1927 when he was studying at the advanced engineering school at Wright Field. There were no 1,000 horsepower motors in those days so he used two 400 horsepower Liberty engines, placing them in the center of the fuselage. Both were geared to a single shaft with an extension going forward and connecting with the propeller. In this way the plane's horsepower was increased and at the same time a new idea was introduced. Not until the first XP-39 appeared in 1939 did engineers try the idea again. Then it was hailed as a "revolutionary design."

Nor is it anything new for propellers to be driven off motor shafts by gear mechanisms. On some of the first planes, namely the first tractors made by the Wright Brothers, twin propellers were used; driven by chain mechanisms connecting with the motor shaft. Both propellers were located well out on the wings, while the motor rested in the fuselage just below the cabane section. This method was used on the Wright Brothers' ship tested by the army at Fort Meyer—the first military airplane.

Audemar in a 1910 Santos Dumont Demoiselle using an *opposed-cylinder* Darracq engine. (Intern'l)

Luscombe "Silvaire" with 75 hp. Continental *opposed-cylinder* fuel-injection motor. Refinement of structure and design is only change from old to new

The Airacuda has pusher propellers; so did early Wright planes. (Acme)



This 1910 Farman had twin rudders and engine at center of wing, driving a pusher propeller. (Intern'l)

the OLD

There Is Nothing New!—The Latest Planes Embody the Oldest Ideas Used Years Ago by Early Pioneers

The two brothers, first to fly in heavier-than-air power-driven craft, also tried out experiments with opposite rotating propellers, which the army air corps is still studying today. Because they encountered too much torque from their small engine it was necessary for the Wrights to use opposite rotating propellers. Today the army is trying out the idea with four- and six-bladed propellers on a Curtiss plane at Wright Field.

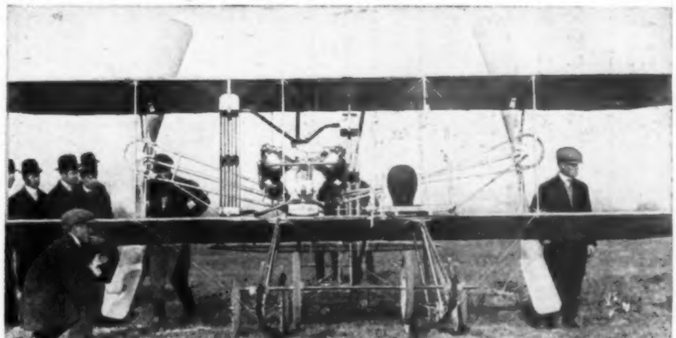
Tricycle landing gears that made news only a few years ago really started with the first of the power-driven flying machines. They were a part of the Wright Brothers' later models, supplementing the earliest skid-type landing systems.

The three wheel undercarriage was also used on the early Standards (1912-1915) which were manufactured by the Standard Aircraft Co. in New Jersey. (These were the first airplanes actually to see any fighting service. Three of them were built to be used by General Pershing and the Mexican Expeditionary Forces in fighting Villa.) This was in 1914 before planes saw any actual combat in the war in Europe.

First "modern" version of the three-wheel landing gear was on a Douglas amphibian plane tested by the army at Wright Field about three years ago. Now, tricycle undercarriages are coming into their own. Such planes as the Douglas DC-4, the Lockheed C-40B, the Lockheed XP-38, the XP-39 and many others, in-

(Continued on page 60)

This Bleriot of 1909, warming up for a take-off, had a shock-absorbing strut landing gear. (Intern'l)



The Baby Wright Racer of 1910 was "up-to-date" with twin props rotating oppositely, a Vee-8 engine over the center of gravity and "twin" three-wheel landing gear. (Intern'l)

The tail wheel is not new but it is used here on the latest North American NA-50 pursuit plane for the Peruvian Air Force

Drexel, in a Bleriot with a tail wheel, takes off in 1910 at Belmont Park, N.Y. (Intern'l)

ELLIPSE AREA CHART.

TO FIND THE AREA OF AN ELLIPSE, PICK OUT ANY SPAN IN THE VERTICAL COLUMN AND ANY CHORD IN THE HORIZONTAL COLUMN; GO RIGHT FROM SPAN COLUMN AND DOWN FROM THE CHORD COLUMN. IN THE SQUARE IN WHICH THESE TWO INTERSECT WILL BE FOUND THE AREA OF THE GIVEN ELLIPSE. FOR THE AREA OF ANY ELLIPSE NOT ON THE CHART THE FOLLOWING FORMULA SHOULD BE USED:

AREA = SPAN X CHORD X .7854

Russell Henke.

AREAS ARE GIVEN IN SQUARE INCHES, CORRECT TO HUNDRETHS.

CHORD: IN INCHES.

SPAN: RIGHT COLUMN INCHES; LEFT, FEET

FT.	IN.	3	3.5	4	4.5	5	5.5	6	7	8	9	10	11	12	13	14	15	16
	6	14.14	16.49	18.85														
1	12	28.27	32.99	37.70	42.41	47.12	51.84	56.55										
	16	37.70	43.98	50.37	56.55	62.83	69.12	75.40	87.96	100.53	113.10							
	20	47.12	54.98	62.83	70.69	78.54	86.39	94.25	109.96	125.26	141.37	157.08						
	22	51.83	60.48	69.12	77.75	86.39	95.03	103.67	120.95	138.23	155.51	172.79	190.07					
2	24	56.55	65.97	75.40	84.83	94.25	103.67	113.10	131.95	150.80	169.85	188.50	207.35	226.20				
	30	70.69	82.47	94.25	106.03	117.81	129.59	141.37	164.93	188.50	212.06	235.62	254.18	282.74	306.31			
3	36	84.83	98.96	113.10	127.23	141.37	155.51	169.65	197.92	226.20	254.47	282.74	311.02	339.29	367.57			
	40	94.25	109.96	125.66	141.37	157.08	172.79	188.50	219.91	251.33	282.74	314.16	345.58	376.97	408.41	439.82		
	42	98.96	115.45	131.95	148.44	164.93	181.43	197.92	230.91	263.89	296.88	329.87	362.85	395.84	428.82	461.82		
	44	103.67	120.95	138.23	155.51	172.78	190.07	207.35	241.70	276.46	311.02	345.58	380.13	414.69	449.25	483.81	518.36	
	46			144.51	162.58	180.64	198.71	216.77	252.90	289.13	325.16	361.28	397.41	433.54	469.67	505.80	541.93	
4	48			150.80	169.65	188.50	207.35	226.20	263.89	301.59	339.29	376.97	414.69	452.39	490.09	527.79	565.49	600.19
	54					212.06	233.26	254.47	296.88	339.29	381.70	424.12	466.53	508.94	551.35	593.76	636.17	678.59
5	60					235.62	259.18	282.74	329.87	376.97	424.12	471.24	518.36	565.49	612.61	659.74	706.86	753.98
	66							311.02	362.85	414.69	466.53	518.36	570.20	622.04	673.87	725.71	777.55	829.38
6	72							339.29	395.84	452.38	508.94	565.49	622.04	678.59	735.13	791.68	848.23	904.78
	78									490.09	551.35	612.61	673.87	735.13	796.40	857.66	918.91	980.18
7.	84										593.76	659.74	725.71	791.68	857.66	923.63	989.60	1055.6
	90											706.86	777.55	848.23	918.91	989.60	1060.3	1130.9
8	96													904.78	980.18	1055.6	1130.9	1206.4
	102															1121.5	1201.7	1281.8
9	108															1187.5	1272.4	1357.2
	114															1253.5	1343.0	1432.6
10	120															1319.5	1413.7	1507.9

ELEMENTS OF RADIO CONTROL

PART 5 By HOWARD McENTEE

EXPERIMENTERS in the field of radio control work who have not had the benefit of considerable radio development work are often at a loss as to what style of antenna to use, particularly for the transmitter. As a matter of fact, for short range work, particularly where the transmitter has reasonable power output, almost any sort of "sky wire" will do, if it is properly tuned to the frequency in use. As the control range is increased, however, or transmitter power is reduced, it becomes imperative to use the most efficient radiating system possible.

Without going into too much technical detail we will cover here a few of the salient points of simple radiating systems suited to this work.

There are several things to be considered; one of the first of which is that many antennas do not radiate a signal of equal strength in all directions. Most horizontal radiators, for example, put out considerably more energy broadside; that is, at right angles to the length of the wire, than they do off the ends. In most cases the range is short enough and sufficient power is available to make this characteristic of minor importance, but it is one that should be kept in mind.

Another of these odd facts is that maximum transfer of energy from transmitting to receiving antenna takes place when both are in the same plane, the latter term referring of course to the position in which each is placed. For example, a transmitting antenna which runs parallel to the earth works best with a receiving antenna which is also horizontal. On the other hand, vertical transmitting and receiving antennas work well together. Here again the effect is not of great consequence in most cases in which radio control equipment is employed, but it is something to consider when the utmost efficiency is desired. This orientation of an antenna is usually called "polarization" and the two main classifications, horizontal and vertical polarization, are self-explanatory.

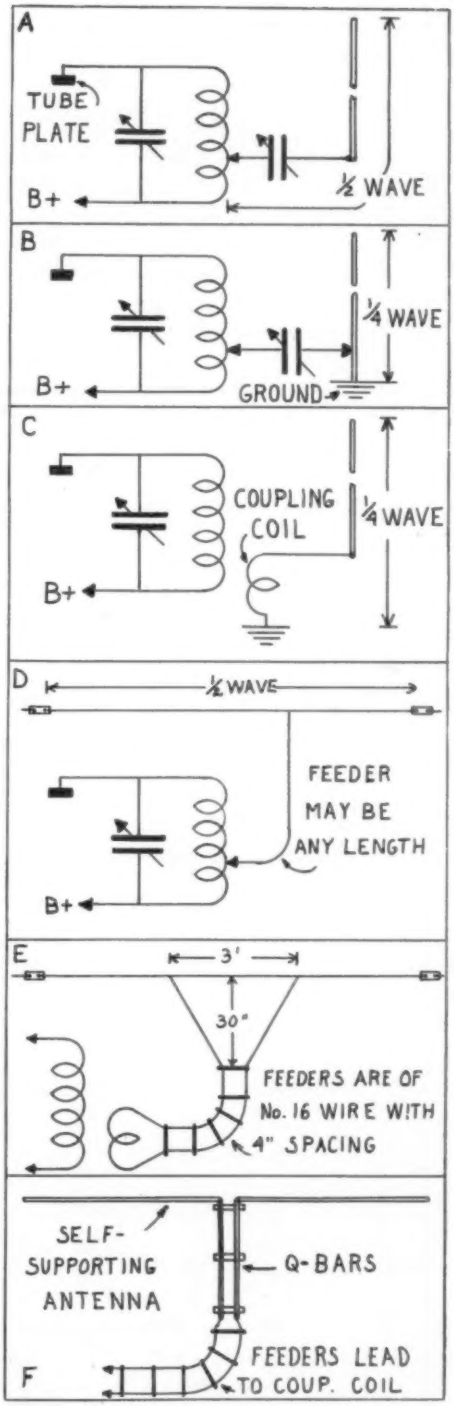
As a matter of fact practically all receiving antennas in this work are horizontal since they run lengthwise of fuselage or wings in most cases.

Now that a few elementary points have been covered, let us see what can be used that is simple and efficient. By far the simplest and most convenient antenna for transmission on the ultra high frequency bands such as we employ, is the so-called half-wave vertical. As the name implies, this is about 1/2 wave high (around 8 feet for the 5 meter band) and is usually in the form of a telescoping rod of several sections, the lower end of which fastens directly upon the transmitter by means of stand-off insulators. Such an antenna is self-supporting, requiring no pole or guy wires and can be put in place in a few seconds. In actual use the lower end is usually connected to the plate coil of the transmitter by means of a clip, and a variable condenser is inserted in the lead, both to keep the high-voltage off the antenna and to aid in adjusting the load properly. This form of antenna is shown in Fig. 1A.

An even more convenient style is the quarter wave vertical, which, as might be expected, is only 1/4 wave high. This can also be fed by a tap on the plate coil, but the feeder wire must be tapped onto the antenna about 14% up from the lower end. The bottom of the antenna must be fastened to a ground point; the transmitter chassis will do in most cases, particularly if the transmitter is placed on the ground. Such an antenna system is shown in Fig. 1B. Another way of feeding this style antenna is shown in Fig. 1C. Here the lower end is connected to a coil of several turns which is placed in inductive relation to the plate tank of the transmitter. Coupling is then varied by shifting the position of the small coil relative to the large. Either of these coupling systems will give good results when properly tuned, but the latter is usually more convenient.

The reader will doubtless wonder why such emphasis has been given to vertical antennas when as mentioned previously most radio control receiving antennas are horizontal. The answer lies simply in the fact that over short ranges the discrepancy is not bothersome, particularly since there is usually power to spare. Moreover, as pointed out, these vertical types are the last word in simplicity and convenience. An interesting point in passing is that vertical antennas transmit energy practically equally in all directions—they are not directional.

Horizontal antennas are usually used when the radiator will be at some distance from the transmitter. A popular type is shown in Fig. 1D, and is known as the single-wire-feed system. The feeder is connected to the plate coil as in Fig. 1B, but may run any reasonable length, and is tapped on to the 1/2 wave antenna at a point about 14% either side of the center.



A system which is usually more efficient is shown in Fig. 1E, and is generally called the "delta match" because of the triangle formed where the feeders join the antenna. This feed system is preferably used with a push-pull output stage, so that the coupling coil may be placed between the two halves of the plate tank to form a perfectly balanced arrangement. The feeders are tapped on both sides of

(Continued on page 48)

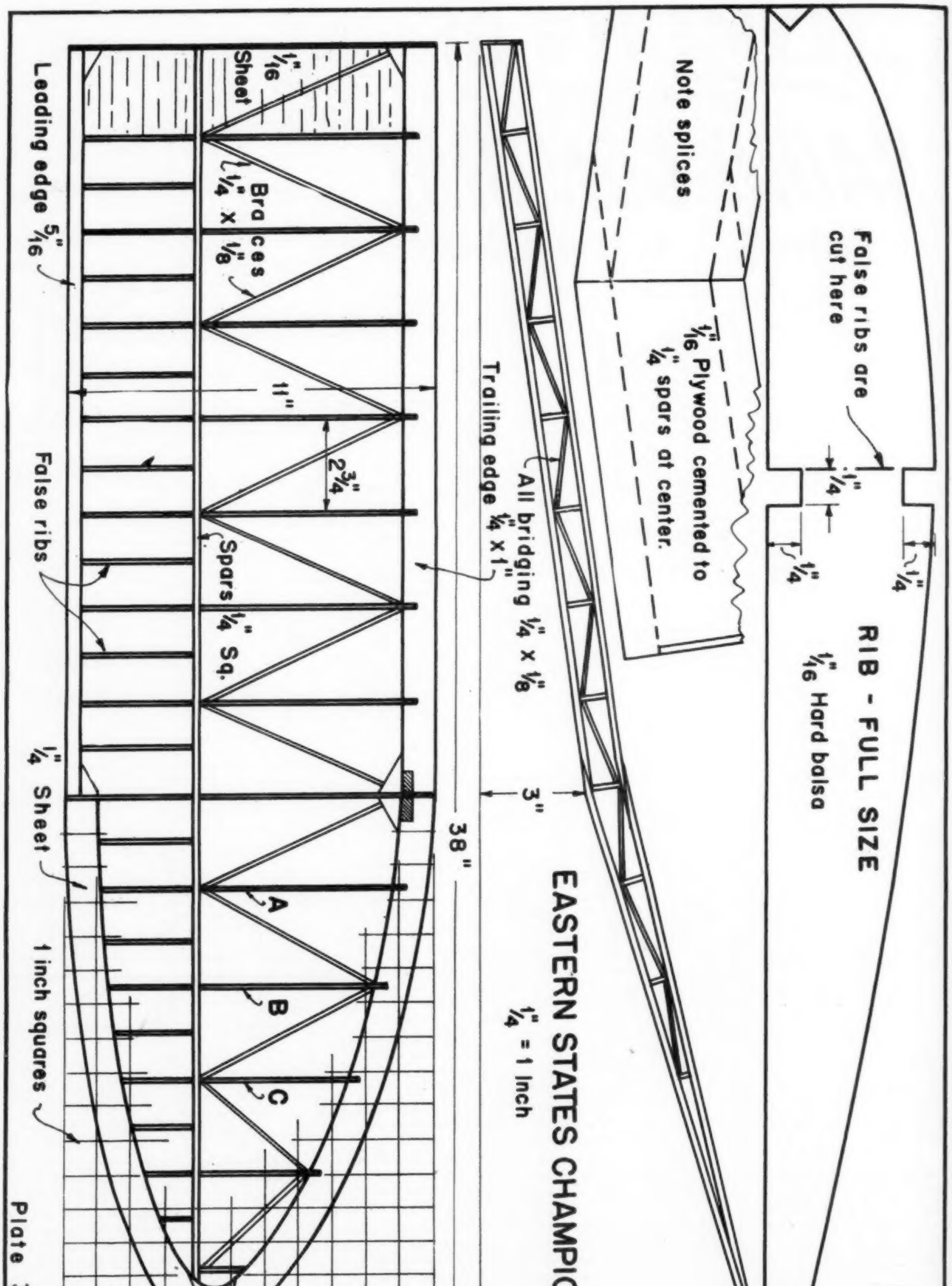

RIB - FULL SIZE
1/16" Hard balsa
False ribs are cut here
1/4"
1/4"
1/4"
Note splices
1/16" Plywood cemented to 1/4" spars at center.
EASTERN STATES CHAMPION
1/4" = 1 Inch
8"
3"
All bridging 1/4" x 1/8"
Trailing edge 1/4" x 1"
38"
11"
2 3/4"
1/16" Sheet
Braces 1/4" x 1/8"
Spars 1/4" Sq.
Leading edge 5/16"
False ribs
1/4" Sheet
1 inch squares
A
B
C

Plate 3.

THE GAS "CHAMP"

By RUSSELL SIMMONS

Tremendous power and soaring ability characterize this remarkable plane

A High-Climbing Soaring Gas Model That Has Placed Among the Winners in Every Contest Entered

Editor's Note

IN THE opinion of the editor, this is one of the finest gas models in the country and with a most consistent performance. It has shown itself equal or superior to all gas models in the East; having placed in every contest in which it has been entered. It climbs with tremendous speed to a high altitude, then leveling off, it exhibits astounding soaring qualities. Following are some of the contests in which it has been entered and the places it has won:

The All Eastern States Meet at Hadley Field: first place with a wing loading of 10-1/2 oz., using a Super Cyclone engine. Another machine of similar design also took third place, using a motor of 52 cu. in. displacement and a wing loading of 8-1/2 oz. In the Trenton, N.J., contest planes of this design took first and second place. It placed second with only two flights; average time being considered. At the American Legion Meet at Hadley Field it placed second. In the three other contests it has placed first, second and third.

This is truly a remarkable ship and gives promise of being the outstanding gas model in the country.

Building the Plane

The first step in building the ship is to enlarge the plans to full size, from the dimensions given. This may be done by redrawing to larger scale or by having enlarged photostats made of the plans.

Fuselage

The first step in building the fuselage is to get all medium-hard wood for the entire construction. The sides are built of 1/4" square balsa. To assure accuracy, build two sides on top of one another.

Use plenty of cement on all joints. After the sides are dried, cement in the crosspieces which are 1/4" square. After the sides are together make the plywood firewall as shown full size on the plans. To assemble the motor skids on the firewall, first cut two 1/2" x 3/4" holes in it; then put the notch in the skids in which the landing gear goes. Use plenty of cement and large balsa fillets on top and bottom of the skids to the firewall.

Incidentally, we used maple motor skids which will last much longer than pine or basswood.

After the skids are in place and dried bend the landing gear from 1/8" music wire; do not heat. The top part of the landing gear should be as wide as the inside of the gussets. The landing gear extends 8" from the skids; allow 1-1/2" on each side on which to put the wheels.

Installation of the landing gear is easy and strong.

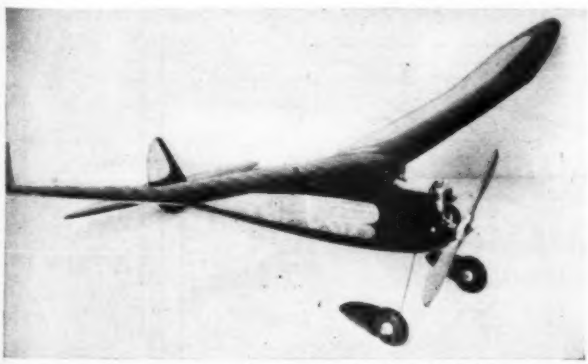
First there is a notch put in the motor skids 1-8" deep for the wire to go into. This helps keep the motor skids from pushing through the bulkhead in event of a collision and holds the landing gear in place. Then clamp the bottom of the landing gear to the bulkhead with steel plates and bolts. The whole bulkhead is then finished and should be put in place with plenty of good cement. Now put crosspieces from the skids to the uprights of the fuselage to brace the skids.

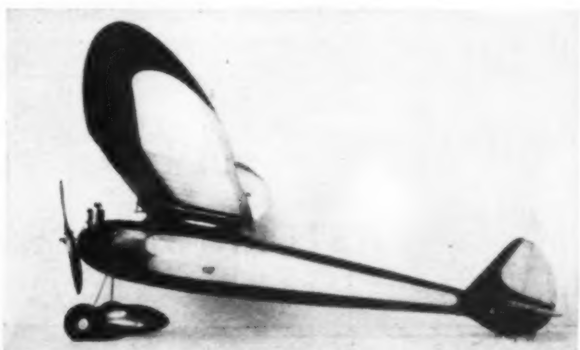
The next step, putting on the stringers, is to start on the sides and cement a 1/8" x

(Continued on page 62)

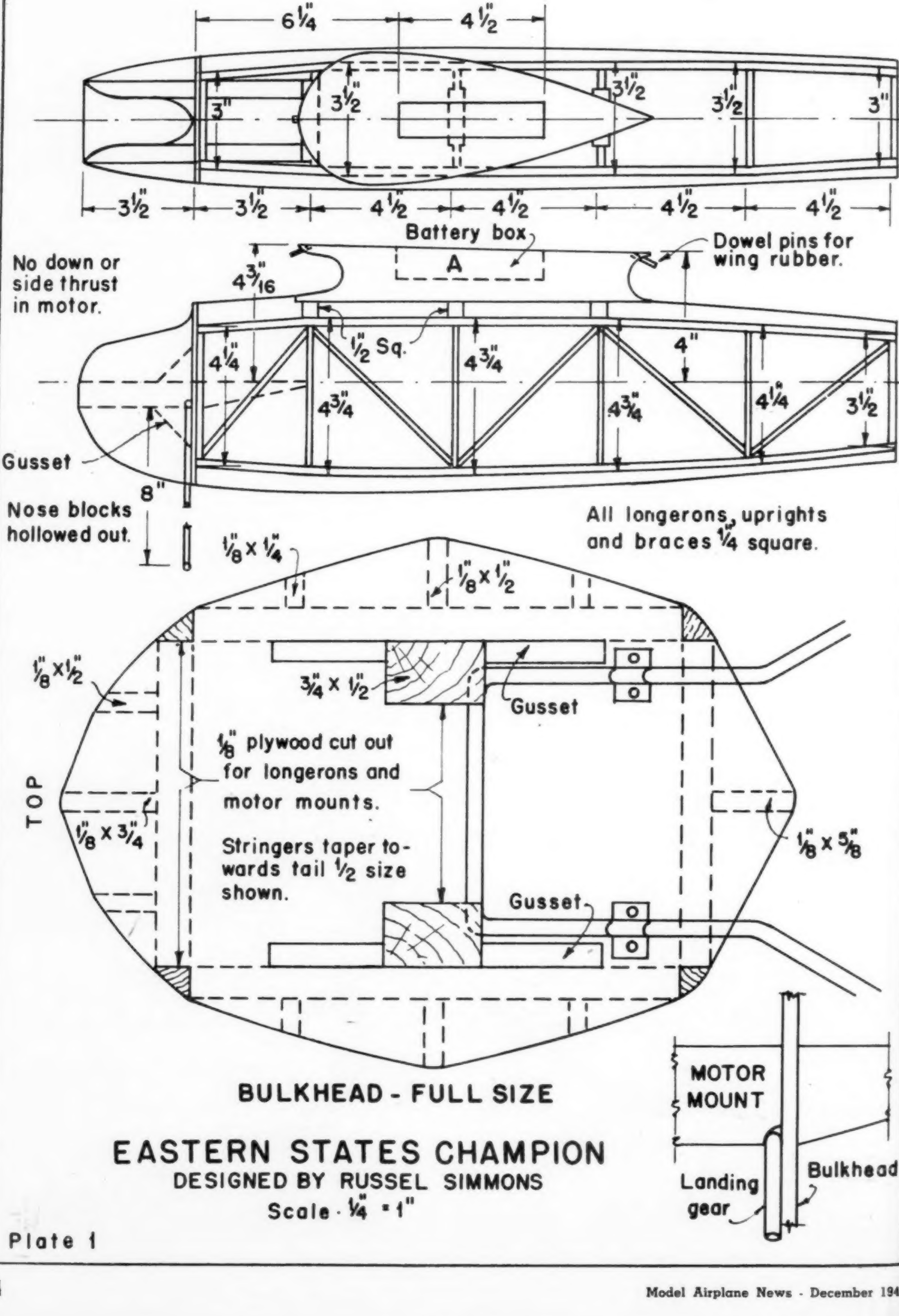
The plane gets up and stays up

The author and plane with some trophies won





Beautifully streamlined, with folding prop to reduce drag. Note the streamlined wheels

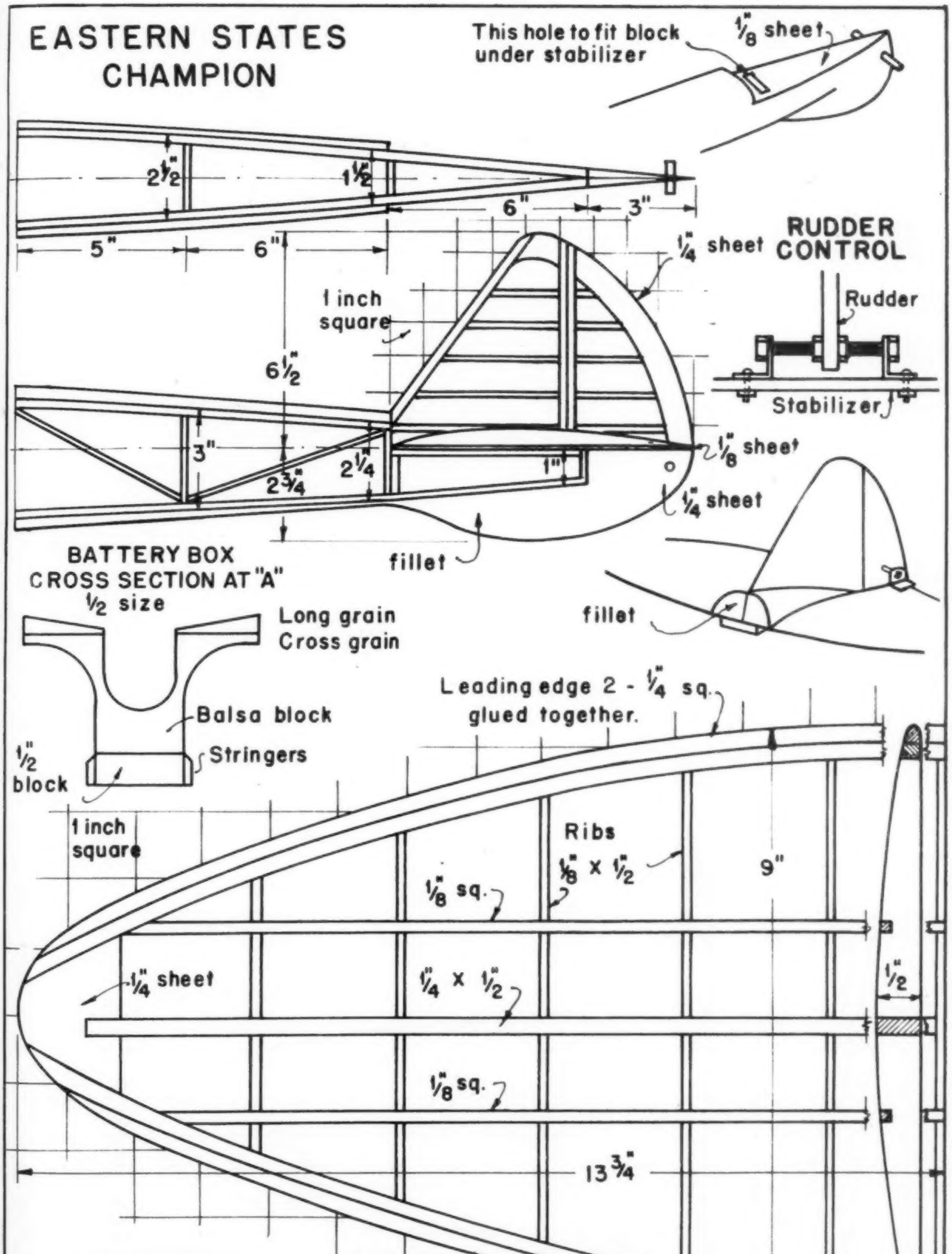


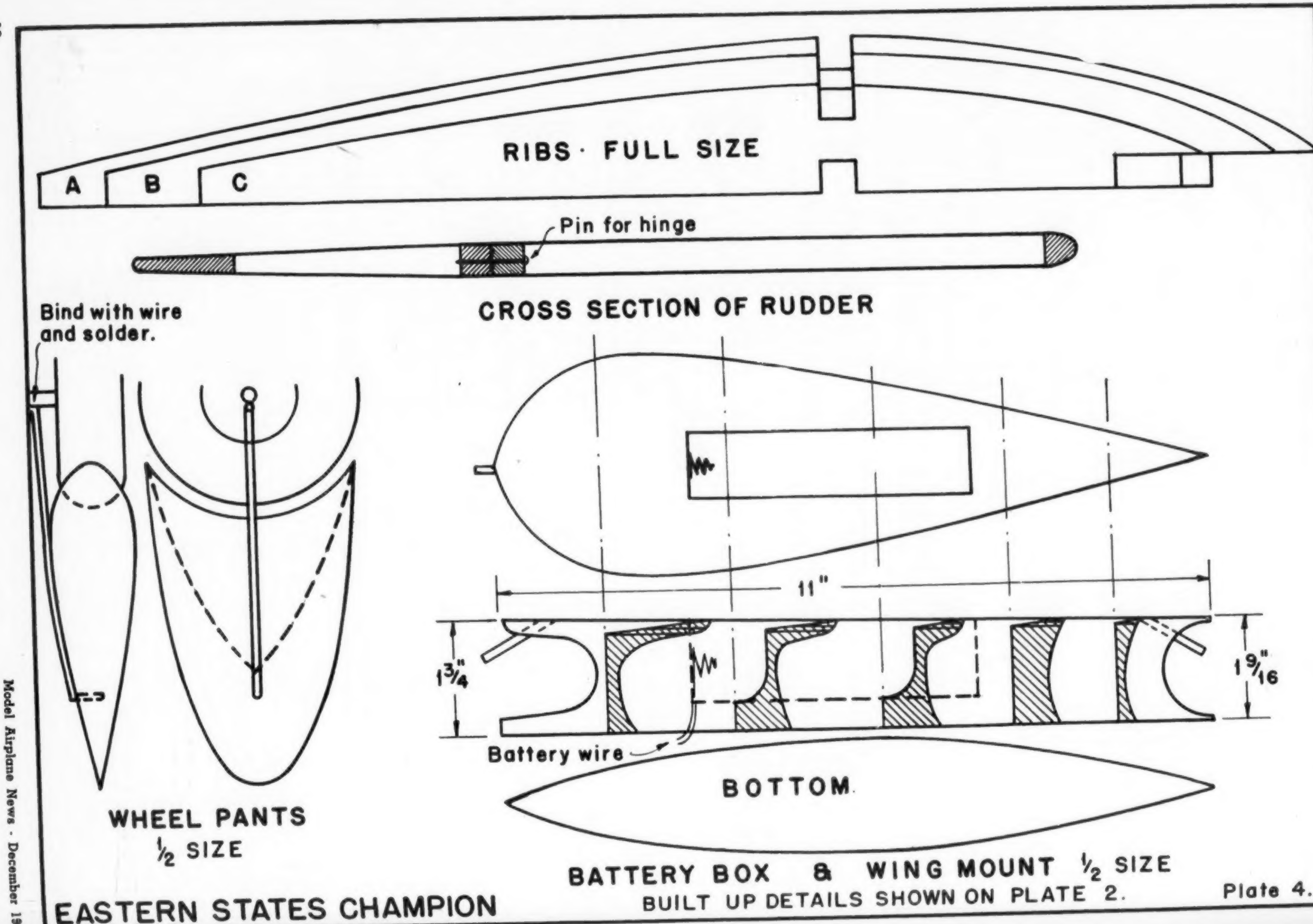
EASTERN STATES CHAMPION

DESIGNED BY RUSSEL SIMMONS

Scale · 1/4" = 1"

Plate 1


EASTERN STATES CHAMPION
This hole to fit block under stabilizer
1/8" sheet
2 1/2"
1 1/2"
6"
3"
5"
6"
RUDDER CONTROL
1/4" sheet
1 inch square
Rudder
6 1/2"
Stabilizer
3"
2 3/4"
2 1/4"
1"
1/8" sheet
1/4" sheet
BATTERY BOX CROSS SECTION AT "A"
1/2 size
fillet
fillet
Long grain
Cross grain
Leading edge 2 - 1/4" sq. glued together.
Balsa block
Stringers
1/2" block
1 inch square
Ribs 1/8" x 1/2"
9"
1/8" sq.
1/4" sheet
1/4" x 1/2"
1/2"
1/8" sq.
13 3/4"
STABILIZER
1/2 size
Trailing edge 2 - 3/16" sq. glued together
Plate 2


RIBS · FULL SIZE
A
B
C
Pin for hinge
CROSS SECTION OF RUDDER
Bind with wire and solder.
11"
1 3/4"
1 9/16"
Battery wire
BOTTOM
WHEEL PANTS
1/2 SIZE
BATTERY BOX & WING MOUNT 1/2 SIZE
BUILT UP DETAILS SHOWN ON PLATE 2.
Plate 4.
EASTERN STATES CHAMPION

MODEL DESIGNING SIMPLIFIED

—Article 1—

By
CHARLES HAMPSON GRANT

A Simple Presentation of Design Principles That May Be Understood and Applied by the Beginner

This series of articles gives the simple basic rules underlying the design of model airplanes and how they may be applied by the beginner. They should prove of great value as a guide to the leaders of groups undertaking the design and construction of model planes for the first time and will show how to apply simple rules to create successful fliers without the application and explanation of complex theories.

MODEL aeroplane designing is the term that usually strikes beginners with awe and dismay, inspiring pictures of complicated diagrams, formulas and scientific problems, the solution of which would be worthy of a university graduate. Actually, Model plane designing can be made very simple and readily understood by young enthusiasts who may never have built or flown a model plane. Only a few basic rules need to be known to lay out a plane capable of stable flight.

It is seldom that a beginner expects his first model plane to really fly. He has high hopes which usually are doomed to failure because, like most beginners, he has built something that looks like an aeroplane without incorporating in its structure the correct model proportions. A model built exactly like a large plane as a rule will not fly well, especially if it is powered with rubber bands. Whereas the flight of a large full scale plane is controlled and corrected by the pilot moving the control surfaces, the model without a pilot must be so proportioned that it will fly itself. In other words, the fundamental requirement of flight is that a model must be stable.

Perhaps you have attempted to fly a model plane, have launched it properly, but have seen it side slip, stall or perform some other manoeuver not on the schedule of events, resulting in a crash landing. Perhaps you have endeavored to adjust the plane in order to have it fly properly, without success. Such a plane evidently lacks stability because of improper designing.

Regardless of how efficient a model may be as far as its wing surfaces and power output are concerned, *it must be stable* in order to *fly at all*. In order to fly *well* it must be *efficient*. This means that with comparatively little power, it should fly a long distance or remain in flight a long time, unless it is a speed model. Thus the first problem in designing a model is to make it stable regardless of other considerations. It is easy to know *what* to do, but quite another to know *how* to do it. We will give you a slight hint of the answer to this mystery however.

The stability of a plane is dependent upon its proportions and the relative size of its parts. Efficiency is important too, but before considering efficiency, let us see exactly how the model plane should be proportioned so it will make perfect stable flights.

First of all, it is necessary to know what basic factors are required for flight. Fig. No. 1 shows a power driver aeroplane in its simplest form. It embodies only the fundamental flight elements. First, it has a wing which generates the lift as it moves through the air. Second, it has a tail plane, stabilizer and rudder, to keep the plane on its course in stable flight. Third, it has a propeller which generates the pull forward as it is turned by the power provided by the rubber motor, the fourth factor. Fifth, the landing gear, which does not increase the duration of the actual flight

(Continued on page 64)

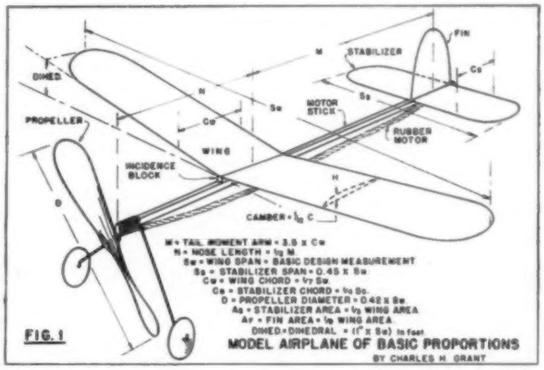
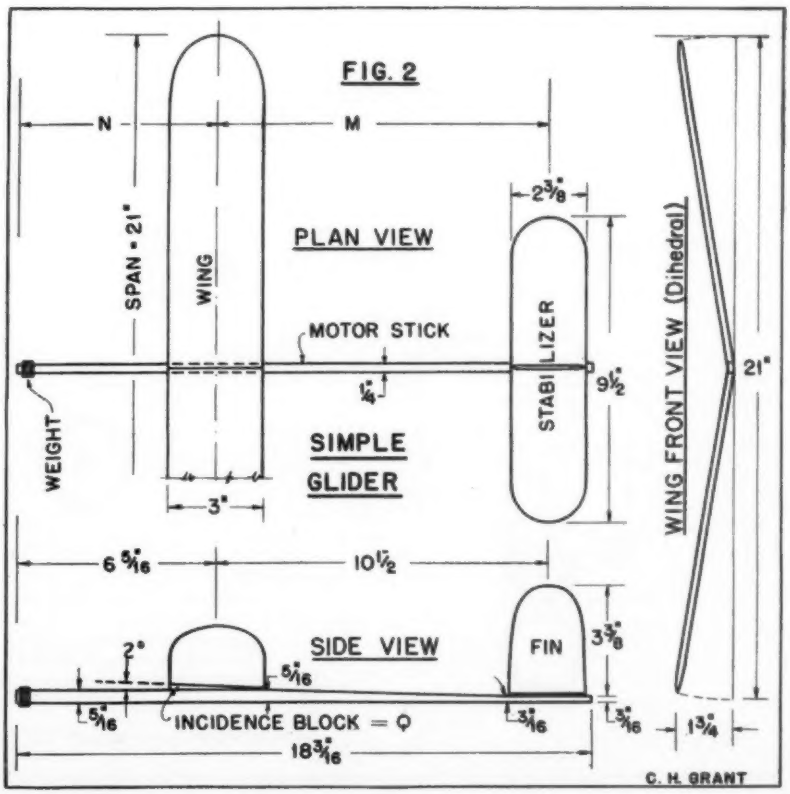
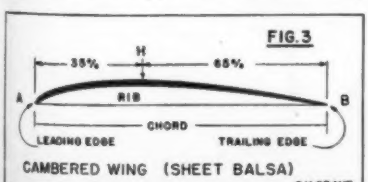


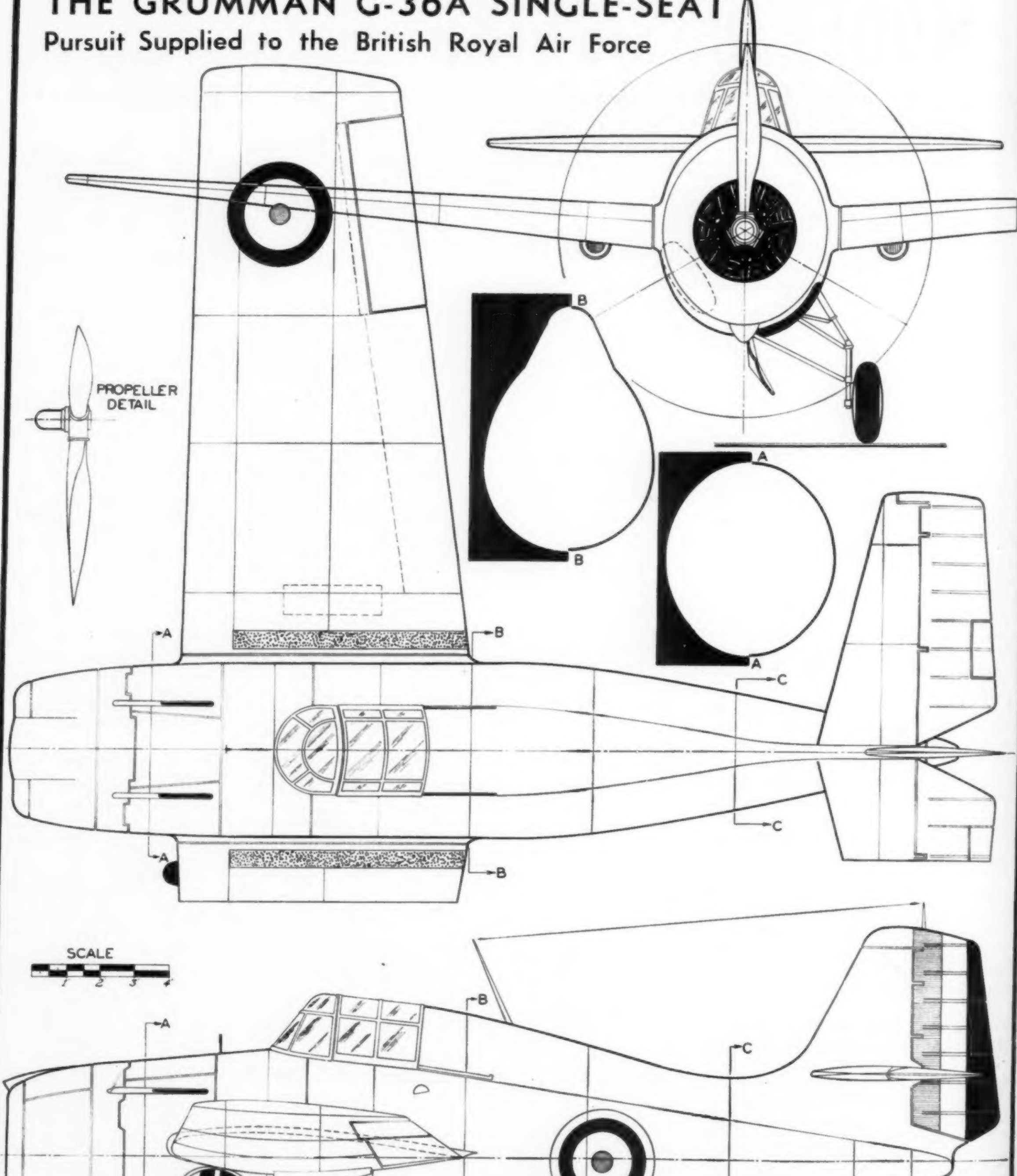
FIG. 1
MODEL AIRPLANE OF BASIC PROPORTIONS
BY CHARLES H. GRANT





THE GRUMMAN G-36A SINGLE-SEAT

Pursuit Supplied to the British Royal Air Force



A Yank In England

THE PLANE ON THE COVER

By ROBERT McLARREN

The Grumman G-36 A single-seat fighter for the British Navy

OUR story this month begins way back in the days when American Aviation was the work of a handful of pioneers, each working independently of the other, each trying by the hit-and-miss system to solve the manifold problem of how to make it fly higher, faster and longer. Prominent then was Grover Arthur Loening, hard at work on the world's first successful amphibian. And prominent in Loening's organization was a sincere, handsome, perpetually-smiling engineer whose design of the famed Loening retractable landing gear which folded into the amphibian's large, single float promoted him to Chief Engineer of the firm. LeRoy Grumman loved the background, but today his famous fighting planes have thrust him very much into the limelight of the foreground, for it is his design that is Britain's latest weapon in the sky: the Grumman G-36A; our Plane on the Cover this month.

LeRoy Grumman's climb to fame has been no skyrocket, for he had labored behind an engineer's drafting table for 15 years; when his first design, the famed Grumman FF-1, the world's first two-seater navy fighter made its debut.

The original and unique Grumman gear was introduced on this ship and has featured all production models since that time. The XF2F-1 was the most radical and dangerous single-seater fighter ever to be put through its paces at Naval Air Station Anacostia, Washington, D. C. The immortal Jimmie Collins lost his life in this wicked little ship during the fatal terminal velocity dive, ripping the twin wings loose from this aerial beast. The production F2F-1's varied greatly from their murderous forebear, you can be sure, and none have crashed due to faulty design or construction. Still more bugs were ironed out in the F3F-1, a lengthened fuselage, which the design badly needed, and more horsepower in the form of the giant Wright Cyclone SGR-1820-G turning out 1,000 horsepower, the first single-seater to mount such a motor.

But the biplane's heyday was drawing to a close and LeRoy Grumman bent his talented efforts towards the design of a monoplane with all the speed and strength of his famed bi-planes. Thus was born the XF4F-1 navy fighter. Its period of development has not been long when viewed in the light of its radical departures from accepted practice. Mid-wing, a landing gear which retracted into the fuselage, a cockpit which gave the pilot vision both up and DOWN and fifty other items heretofore untried. Came the F4F-2 and F4F-3 revisions, the latter a complete structural re-design. And in the midst of this development work came: World War II. Thus everything went overboard, the production line was cleared and the Grumman G-36A is now in quantity production for the Royal Air Force, Fleet Air Arm division.

The Grumman G-36A is a single-seat, single-engine, mid-wing cantilever monoplane with retractable landing gear and sliding hatch-type cockpit enclosure. The ship is all-metal throughout with the exception of the control surfaces which are fabric covered. "Square tips" have been utilized on both wings and tail surfaces for aerodynamic and production efficiency.

The fuselage is of circular cross-section tapering to a smooth oval section near the aft end of the ship. It is of full monocoque construction, being built up on conventional bulkheads of pressed flange and channel-section types. The longerons are of extruded "Z" section aluminum and are riveted to the formers by small clips and angles. The entire framework is covered with 24 ST Alclad-sheet aluminum riveted to the stringer-former combination. The firewall is of stainless steel sheet riveted

(Continued on page 40)

Be Original!

URGES THE INSTRUCTOR

THIS is a plea for a little more originality in model aviation.

Too many folks are thinking alike and acting alike in building and flying their model aircraft. Why, it's getting so, original design craft are almost as scarce as hen's teeth—and we haven't seen any hen's teeth in a dog's age.

Now, don't get us wrong. . . . We haven't a thing agin' kit models. In fact, the recent growth of American aeromodeling is directly traceable to the fine kits that have been engineered, manufactured and distributed throughout the country. No, indeed, kit models are grand and provide an excellent means of more new modelers taking up the sport with greater assurance of success and continued interest than as if there were none of these splendid "here's-the-plans-you-put-'em-together" kits.

Our plea is directed to the advanced modelers—those flyers who are capable of stepping ahead of the field and winning contests, or at least, "talking" a good fight.

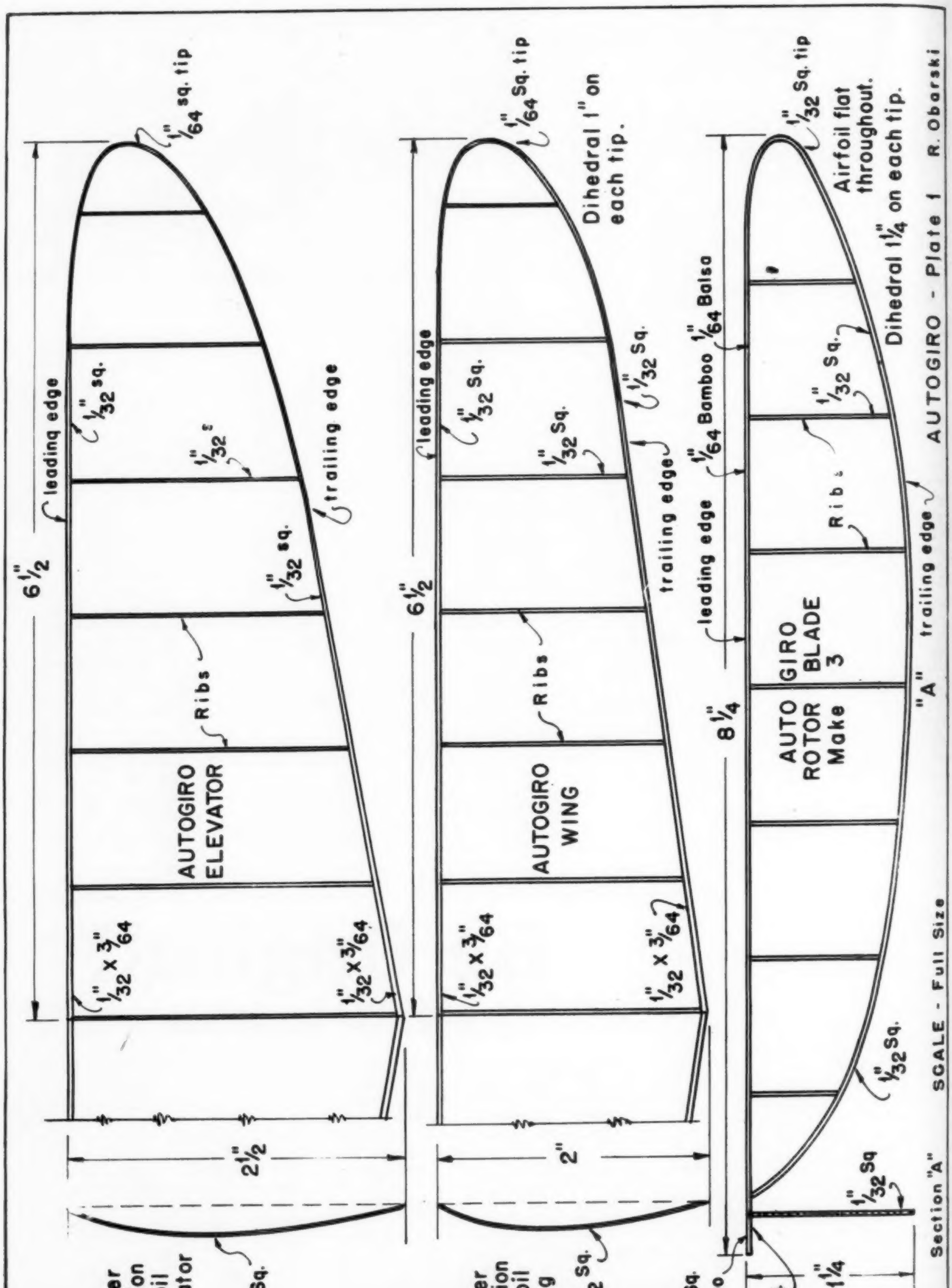
What happens under the present system of self-imposed regimentation? Well, a lot of fellows are following the same rules governing the general size characteristics of their flying models, but let it be noted here that these regulations (official A.M.A. rules) DO NOT LIMIT performance characteristics. That's why they're the best rules adopted to date by the governing body for model aviation.

So here are these thousands of flyers all attempting the same thing: The development of superior ships within the rules. What happens? One or two models clean up in competition, and before you can say "cathedral is the opposite of dihedral" every modeler in the country is building copies of the winning ships.

Now, couldn't some of these chaps be a bit more original in their work? There's nothing quite so satisfying as creating an object which is your own brain-child and which proves better than the average run of whatever you're attempting to create. Take the fellow with the mousetrap—everyone beat a path to his door except the other mousetrap manufacturers. They were out trying to build an even superior product—following a law of human nature which results in many different versions of similar products.

Trouble seems to be that most American men want to dress and act alike, and all too many of their model building offspring follow in their footsteps. Now take the

(Continued on page 50)

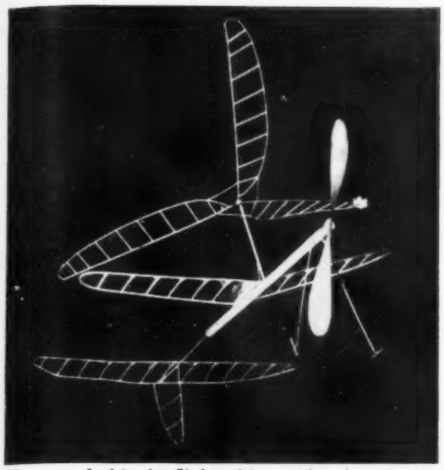


AUTOGIRO ELEVATOR
AUTOGIRO WING
AUTO ROTOR Make
GIRO BLADE 3
Center Section Airfoil Elevator
Center Section Airfoil Wing
Section "A"
"A"
leading edge
trailing edge
Ribs
6 1/2"
2 1/2"
2"
8 1/4
1 1/4"
1/64" sq. tip
1/64" Sq. tip
1/32" Sq. tip
1/32" sq.
1/32" Sq.
1/32" x 3/64"
1/64" + Sq. bamboo
1/32" Sq. balsa
1/64" Bamboo
1/64" Balsa
Dihedral 1" on each tip.
Airfoil flat throughout.
Dihedral 1 1/4" on each tip.
SCALE - Full Size
AUTOGIRO - Plate 1
R. Obarski

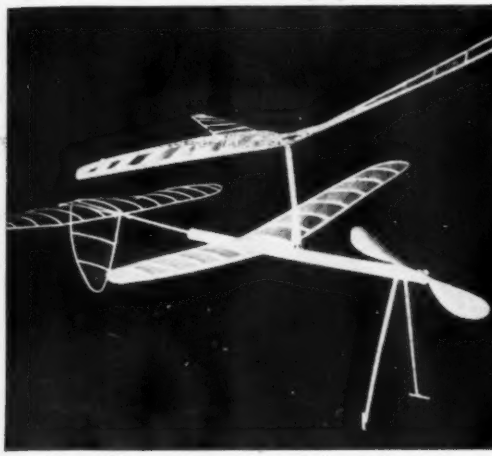
A WORLD RECORD AUTOGIRO

How You Can Build a Record Breaking Indoor Autogiro that has Flown for 2 Min. 26.5 Sec.

By RICHARD OBARSKI



The record ship in flight. No motion is apparent because of the slow rotor and prop rotation



Quite different from the orthodox indoor plane

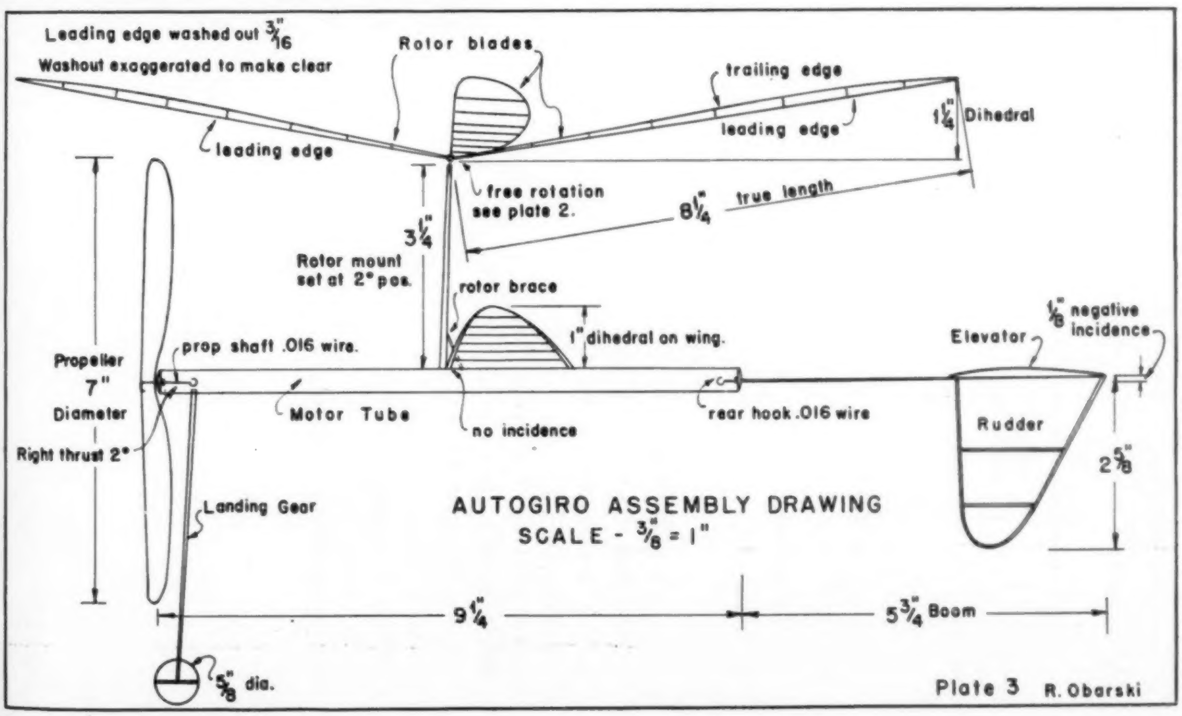
As a result of a mass attack on all existing indoor records by the Chicago Aeronuts a short while ago, the Autogiro, Helicopter, and Ornithopter records were broken almost beyond repair. At this time Ralph Kummer of St. Louis paid a visit to Chicago and brought his tissue-covered indoor autogiro. He made a flight ot about two minutes and gave the Chicago group a basic design to work on. Alton Du Flon held the senior autogiro record with 2 min. 1 sec. The junior record was about 53 sec. and there was no open record at that time.

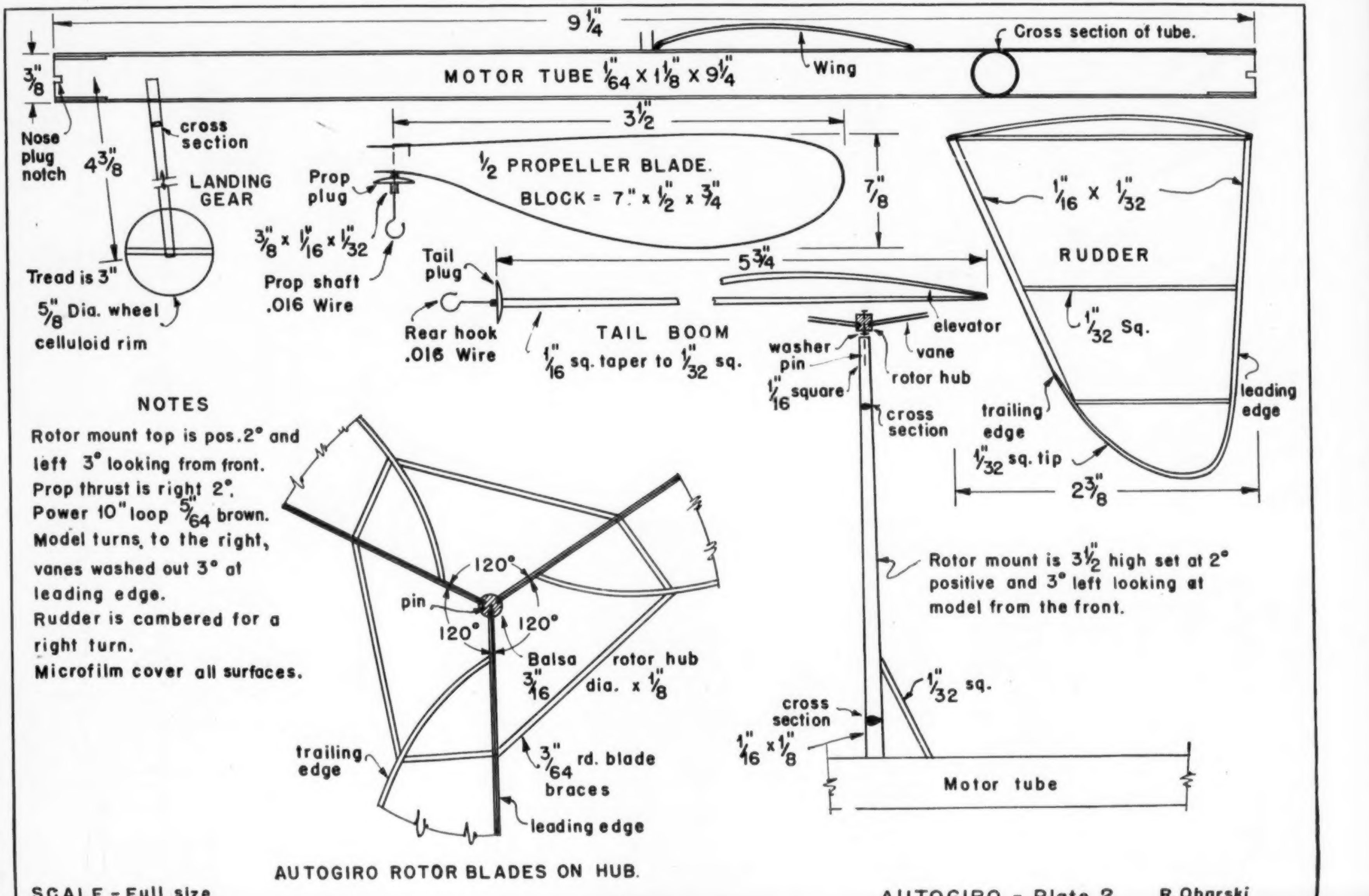
The autogiro presented in this article is a result of painstaking effort in building and flying; though the design, when completed, looked very little like a model airplane. In fact, when it was flown, it was the subject of much ridicule. However this did not matter for the design proved efficient.

Each part of the model plays an important part in its stability. It might be stated here that an autogiro, which, without doubt, is most difficult to adjust, cannot make satisfactory time turning with the torque. This is an important matter, so remember it. This model has two degrees right thrust in the propeller, the rudder is cambered for a right turn and the wing and elevator are washed-in slightly for a right turn.

This model's record time is 2 min. 26.5 sec., but it has flown 2 min. 53 sec. unofficially. Both of the above flights were made in January and in an armory whose temperature ranges from thirty degrees to forty degrees during the winter months. Despite this cold handicap, the model flew within 20 ft. of the roof, which is considered a great deal of altitude for a model autogiro, as the ceiling is 90 ft. The prop R.P.M. was about 500. You may think

(Continued on page 57)





NOTES

Rotor mount top is pos. 2° and left 3° looking from front.
Prop thrust is right 2°.
Power 10" loop 5/64" brown.
Model turns to the right, vanes washed out 3° at leading edge.
Rudder is cambered for a right turn.
Microfilm cover all surfaces.

FRONTIERS

Highlights of the Latest Developments in Aviation

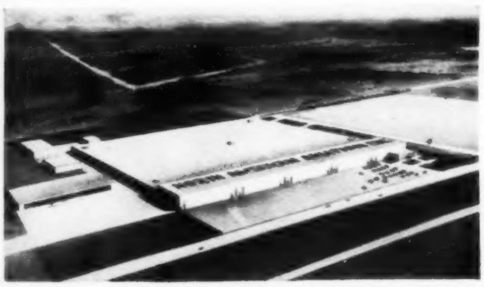
By ROBERT C. MORRISON

The new 300 m.p.h. North American medium-bomber, B-25, being inspected by Gen. H. H. Arnold

HERE is something new which we definitely have never discussed in these columns before: and, as a matter of fact, we never had the slightest notion that such a topic would ever come into being. The purpose of these articles has been to bring out the highlights of new airplane designs, if possible, before anybody else could get the same "dope" published. Since our accent is on new airplane designs it is only fitting that the aeronautical engineer, who is the "responsible party" in the design, receives his contributory space of printed matter . . . so below we have an item that should interest him very much, as well as others in aviation. Just what effect this new-type engineer will have on new airplane designs we will not venture to predict. Just draw your own conclusions:

The Brewster "Buffalo", single-seat fighter now seeing service with the British Air Force; powered with a Wright "Cyclone"

If you have ever gone through an aircraft factory you may have noticed, in various parts of the shop, ordinary refrigerators as are used in your own homes. However, instead of extracting a tray of ice from one of them, the tray will most likely be filled with rivets. These rivets are maintained at certain temperatures so they will retain required strength qualities. But now it seems that the aircraft manufacturers are going to keep their aeronautical engineers "on ice" so they can produce their maximum amount of work! Little did the engineers realize, while concocting new flying creations, that some architect would get to work on them and possibly develop a new species! But to boil the whole thing down, it amounts to the following:



An artist's version of the new North American windowless, air-conditioned factory which will aid the enlarged defense program. Ground was broken Sept. 28th

It seems that the summer California sun has not let the Chamber of Commerce down a bit this year; as a matter of fact in some of the hot spots in the West and Middle West the designers and draftsmen did not k n o w whether or not they would turn into roast pork before the day was ended. Now that practically every aircraft company in the United States is overdoing itself in expansion programs, their new buildings will be the last word in air-conditioning. They are going the full extent and are not meeting the problem half-way: There will be no windows or skylights in the drafting rooms whatsoever; just plain, thick, concrete walls and ceilings. Fluorescent lighting will be used throughout. A cooling system will be employed to maintain the best temperature in which the men may most efficiently work and be protected from the hot sun. During first experiments it may be necessary for the draftsmen to go around with thermometers in their mouths or wear raccoon coats until things get under control. Someone said that they should draw all their plans with phosphorescent pencils so they could still be read when the lighting system goes out of order. Well, anyway it will be one way for a company to keep their new secret plans "in the dark." Stop! . . . That's enough!

The Heinkel He-112 fighter, held in reserve to replace the Messerschmitt 109. Speed, 360 m.p.h.: 1050 hp. Dainler-Benz

If one questions all this just watch the new plants as they are built. The Vega Airplane Co. will probably be the first one to have its engineering "dark room" completed at the Union Air Terminal in Burbank, California, and if it is successful others will mushroom in short order; perhaps even entire shop space as well will be of the same design. This type of construction would also facilitate bomb-

(Continued on page 50)

A Douglas "Boston" DB-7, twin engine light-bomber reposes on an R.A.F. field in Britain before going into action

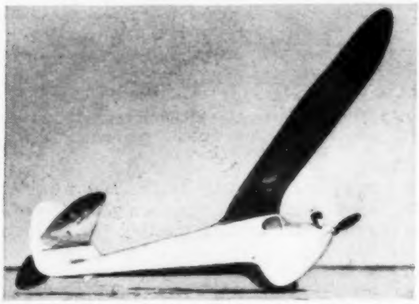
The new Douglas SBD, the American version of a "Stuka" dive-bomber and superior to its namesake in performance

Pict. No. 1. Joe Hudson launches his pursuit-type gas model biplane; a fine flier

GAS LINES

AIR WAYS

NEWS OF MODELS AND BUILDERS FROM ALL PARTS OF THE WORLD



Pict. 4. A one-wheel design by Elbert Weathers. He always turns out something different

ONE of the most interesting things about attending gas model contests is looking over the various designs and checking on the performance obtained. Builders are constantly trying to determine the effect of various features of design upon their plane in flights; eliminating those which are not contributing to stability and efficiency and using those which apparently are helpful.

The "rub" comes in diagnosing the causes of various types of performance and maneuvers. It requires a thorough understanding of aerodynamic principles and their effect upon planes in flight to correctly determine causes of trouble or of fine performance. Consequently, a few pertinent comments about features of planes seen at recent contests may be helpful.

Picture No. 1 shows an interesting biplane built by Joe Hudson of Philadelphia, which flew successfully at the Quaker City Contest. The ship puts up a consistent performance.

Usually the same difficulties haunt the gas biplane builder as those who build rubber models of this type. A common fault is excessive torque and low-power efficiency in biplanes. Due to a small wing span, the torque of the average propeller causes the plane to bank sharply. The cause has been a mystery due to a very common bad habit among model builders; namely, making the propeller with too little blade area. This causes an excessive angle of attack on the blade, an angle far above the angle of maximum L/D or efficiency. Consequently, the majority of power

Pict. 9. Paul Leiendecker who "cleaned up" this season

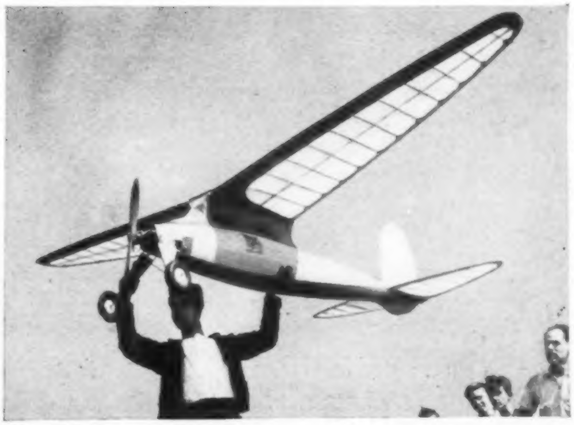
Pict. 10. William Drager receives awards at the Pine Valley, N.J., contest.

Pict. 11. A perfect scale SE-5 and builder, Frank Hernandez. In the air it's like the "real thing."

Pict. 12. The Denver Gas Model Club Exhibit

Pict. 13. The Fox Valley Model Club on an outing

Pict. 2. A tense moment at the Anderson, Ind., "Bulletin" Contest



Pict. 3. George Harland's 12-1/2-footer at the Sky-Scrapers meet

is transformed into drag rather than thrust. It is cured simply by either lowering the pitch or increasing the blade area, or both.

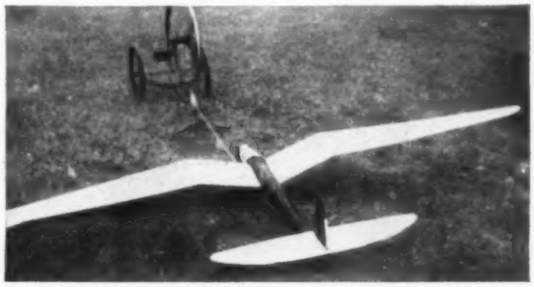
In other words, make the propeller just as large as possible. The propeller customarily used on a Brown engine is 14 inches; which diameter is effective but not the most efficient. Much better results, with an unhesitating climb, can be obtained by lowering the pitch to 7 inches and increasing the diameter to 16 inches; or, if you prefer, increasing the width of the blade rather than diameter.

The excellent flights made by Russell Simmons' ship are due in large respect to the efficient propellers which he uses; these props have considerably more blade area than the average.

Try this remedy on some of your future flights.

Picture No. 2 shows a dramatic moment at the Fifth Annual "Bulletin" contest held in North Anderson, Indiana. The crowd watches with expectancy the take-off of a gas job. The attitude of the plane probably raised doubts among those present as to whether it would fly or crash.

If the fin area was small enough the ship would have righted itself; if large it would serve as an elevator, holding up the tail and allowing the nose to drop with the result of an inevitable crash. A way to correct the trouble would be to increase the dihedral for the relationship between dihedral angle and fin area, which would have a bearing on the recovery of the flight position shown. Many builders have increased their dihedral to improve stability, believing it was the dihedral alone that corrected the trouble; whereas actually it was the fact that more dihedral relative to the fin was added. The same effect could have been produced by reducing the fin area and leaving the original dihedral.



Pict. 8. Bill Salmon's 8-ft. soarer and homemade towing gear

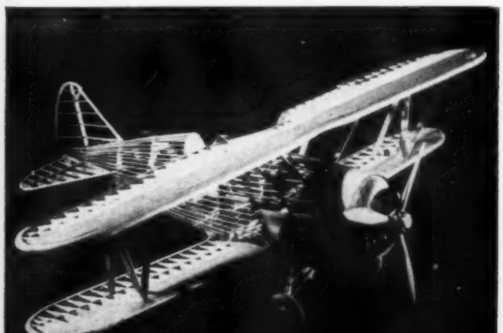
Picture No. 3 shows a 12-1/2 foot ship built by George Harland of the Air Screws Club. It was flown at the Sky-Scrapers Contest. The power is an Okay twin-cylinder engine. Unquestionably small planes are convenient to transport and fly; however they never will hold the interest provided by a large ship of this type as it leaves the ground for flight.

From the design of this ship, measuring it according to design rules, one would believe that it had a tendency to stall even though all surfaces were set and adjusted for correct normal flight. The low thrust line would indicate this. When this line is below the C.G. a couple is created when climbing at steep angles. It tends to increase the angle of climb eventually to the stalling point; whereas with the thrust line above the C.G. a couple is created which tends to reduce the spiral tendency under these conditions.

It is strange to see young men go to great lengths and trouble to work out a beautifully built airplane, one that shows a high degree of craftsmanship, and to realize from its aerodynamic design that very little thought was given to the fundamental factors that will produce successful flight. It is all very well to produce a good-looking airplane but good looks are a poor substitute for performance, at least in contests. Apparently builders see more with their eyes than with their minds.

Picture No. 4 shows a beautiful ship built by an old and expert hand, Elbert J. Weathers of 4420 Seventh Avenue, Los Angeles. Mr. Weathers is continually creating planes embodying new ideas. One unusual feature in this model may be readily seen; the pod-effect under the nose of the fuselage which

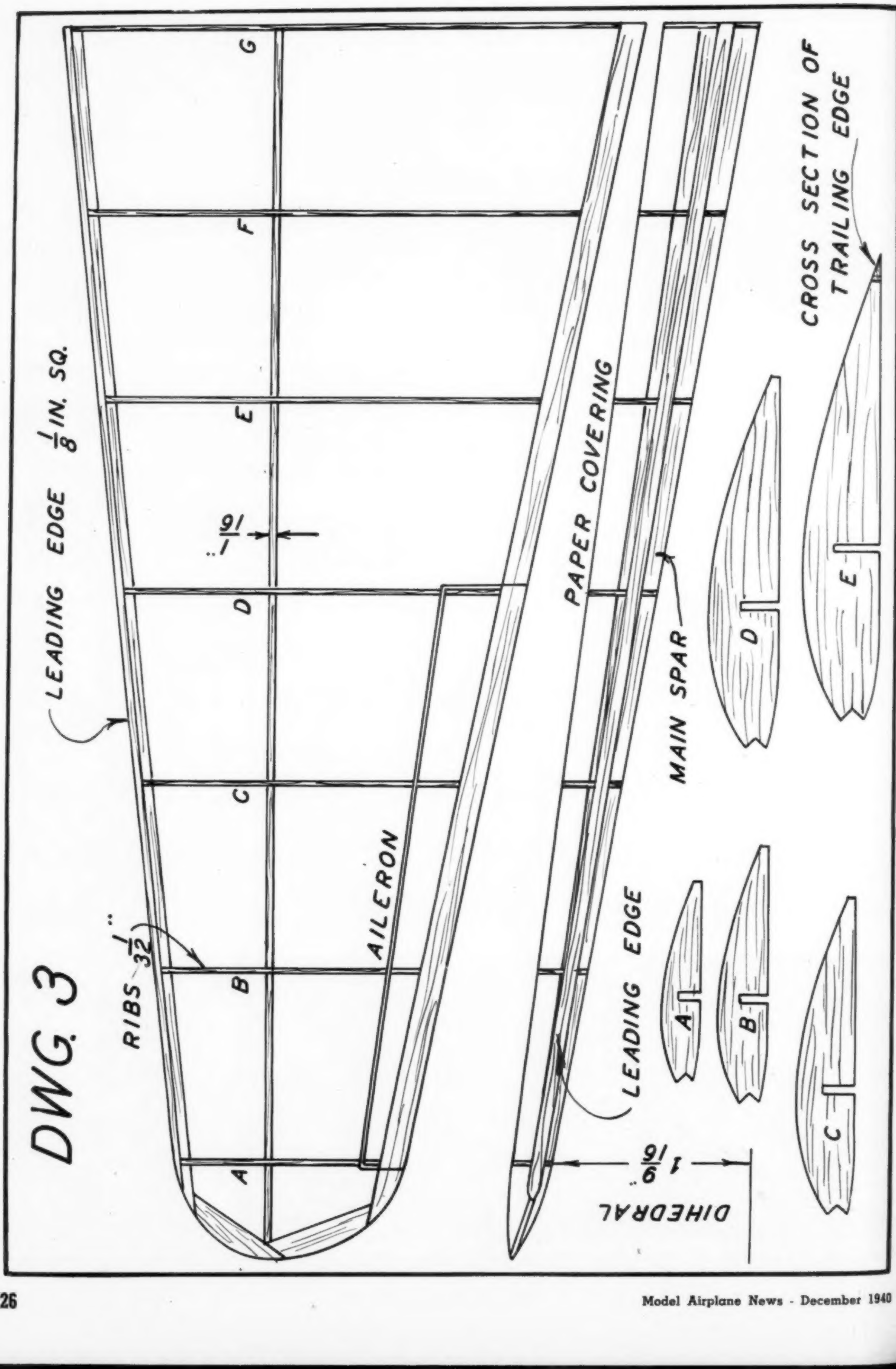
(Continued on page 65)

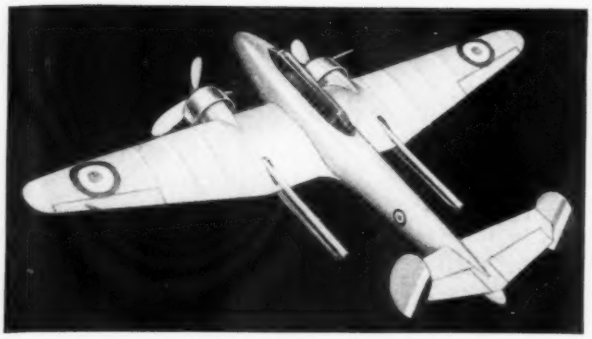


Pict. 5. This scale Grumman F3F-1 by Ed Eaklor is perfect in detail, even to the retractable landing gear

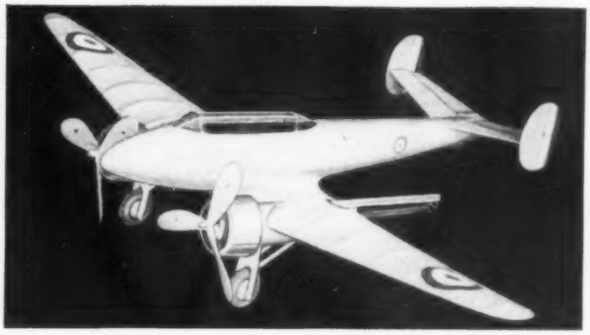
Pict. 6. This contestant at the Nationals cut out his microfilm with a cigarette

Pict. 7. A 2-1/2 inch detail scale SE-5 ! ! !


DWG. 3
RIBS 1/32"
LEADING EDGE 1/8 IN. SQ.
1/16"
A
B
C
D
E
F
G
AILERON
PAPER COVERING
MAIN SPAR
LEADING EDGE
DIHEDRAL
1 9/16"
CROSS SECTION OF TRAILING EDGE



Sturdy structure and two motors give strength and power



A realistic replica of a famous French fighter

BUILDING THE POTEZ TWIN

By ROBERT V. SMITH

How You Can Build an Exact Scale Twin-Motored Fighter With Unusual Flying Ability

THE POTEZ 63 brings into concrete being the modern formula of the multi-purpose airplane; it is a light three-seater for defense, fighting, reconnaissance and bombing. For each of its various duties; fighting, reconnaissance, or bombing, it possesses a performance and military qualities which put it in first rank among the products of international aviation.

Provided with a retractable landing gear, variable pitch propellers, split-trailing-edge flaps and 670 horsepower Hispano Suiza 14 Hbs engines, its maximum speed is in the neighborhood of 300 miles per hour. It can reach its operating height of 13,000 feet in less than 5 minutes and it can also fly at this level with one engine stopped without a very great loss of speed.

An outstanding characteristic of this low-wing monoplane is the empennage. The twin rudders remind us of the familiar Lockheed "Electra" and the pronounced dihedral tail is definitely Potez. This tail with the marked dihedral is not, as might be reasonably suspected, used entirely for aerodynamic purposes, but rather to keep the fins and rudders free of the ground. It has been said, though, that the ship performs much better with this distinctive type of tail arrangement.

The Potez 63 mounts two cannons in the lower part of the fuselage and a free rear machine gun, wireless, night-flying equipment and apparatus for internal communication. Provision is made for about 92 gallons of fuel.

This model, built approximately to a 1/2 inch to the foot scale, is a very exceptional flyer considering the fact that it is twin-motored. The retractable landing gear mechanism has been omitted for simplicity, but with a little ingenuity the builder can make each landing gear leg fold back into the nacelle. Some builders may disprove the use of external motor sticks and find that they want to use gears and flexible drives; that is all very well and good but it is really much simpler to use the motor sticks.

Well, there is no time like the present to get started with this little model, so let's go. A little patience and careful workmanship will reward the builder with a fine model.

Fuselage

As this part of the model seems to be its backbone, we shall lead off with its construction.

The first step will be to procure two rather soft balsa blocks free from blemishes and knots, size each 3/4" by 2 1/4" by 20". Glue these temporarily together; glue at just about three points will be sufficient as these halves have to be separated after they are shaped externally.

Join drawings 1 and 2 together and trace the side outline on the blocks and then with a sharp knife shape the blocks to the outline drawn. After this step has been finished proceed to do the top of the fuselage in the same manner. Make some templates from quite stiff paper or thin sheet metal and then start to round off the fuselage so that its cross section will conform very closely to the section of the template. A fairly heavy grade of sandpaper will come in very handy for the roughing down and when it is nearly down to the required size use a much finer grade of paper.

The plane in full flight will thrill you with its realism and performance

The next procedure is to break these two halves apart, which can easily be done by the skillful use of a thin-bladed knife.

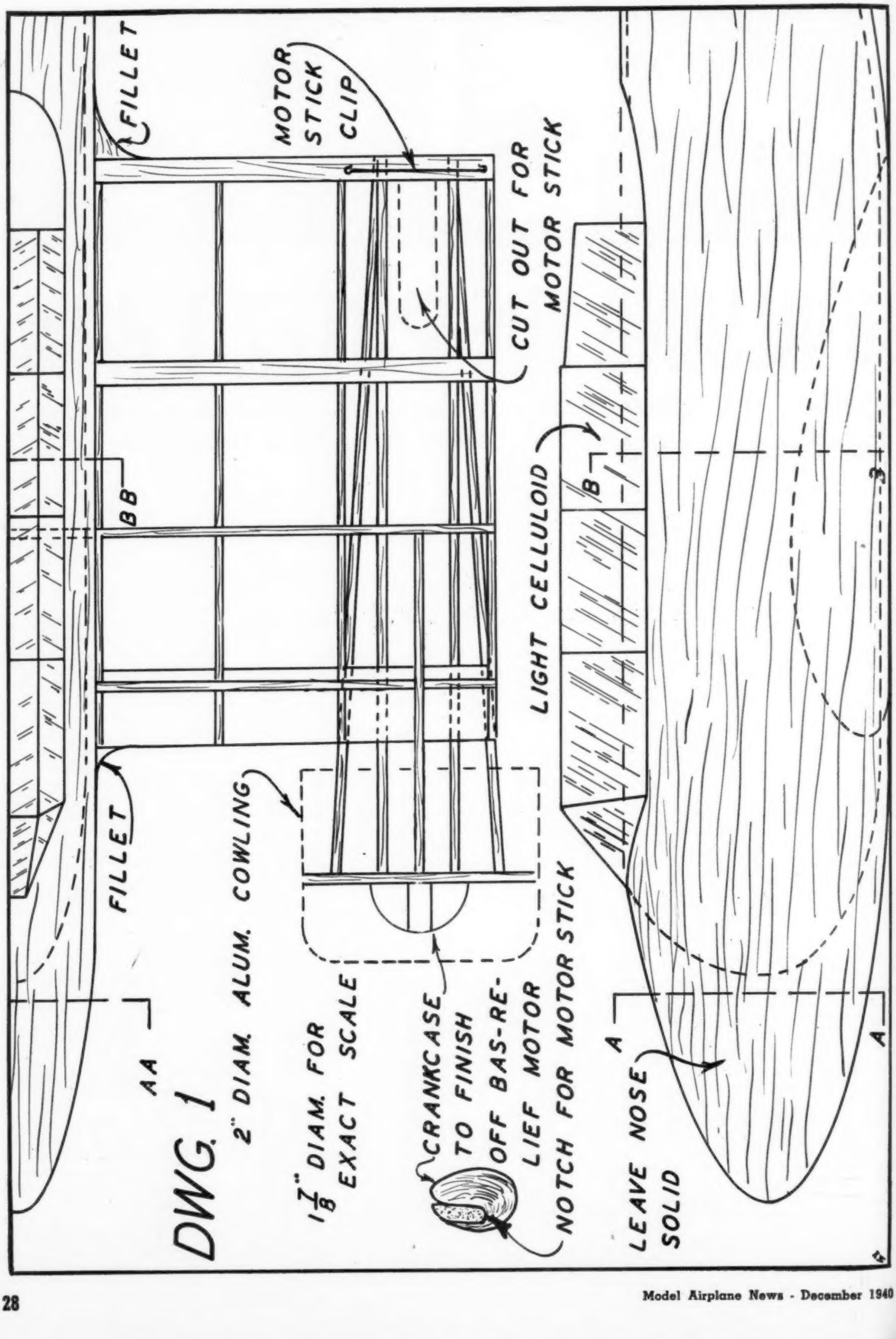
Now we come to the fun of the thing! The fuselage has to be hollowed out. This is best done with a small pen-knife but a small gouge will come in handy. The walls should be about a sixteenth-of-an-inch thick but it is advisable to make them actually thinner. As the motors are carried externally, strength is not of primary importance. Note, too, that the nose portion of the fuselage is left practically solid; this is done so that the model will balance better. The tail portion is also left solid so that the tail will have a firm foundation.

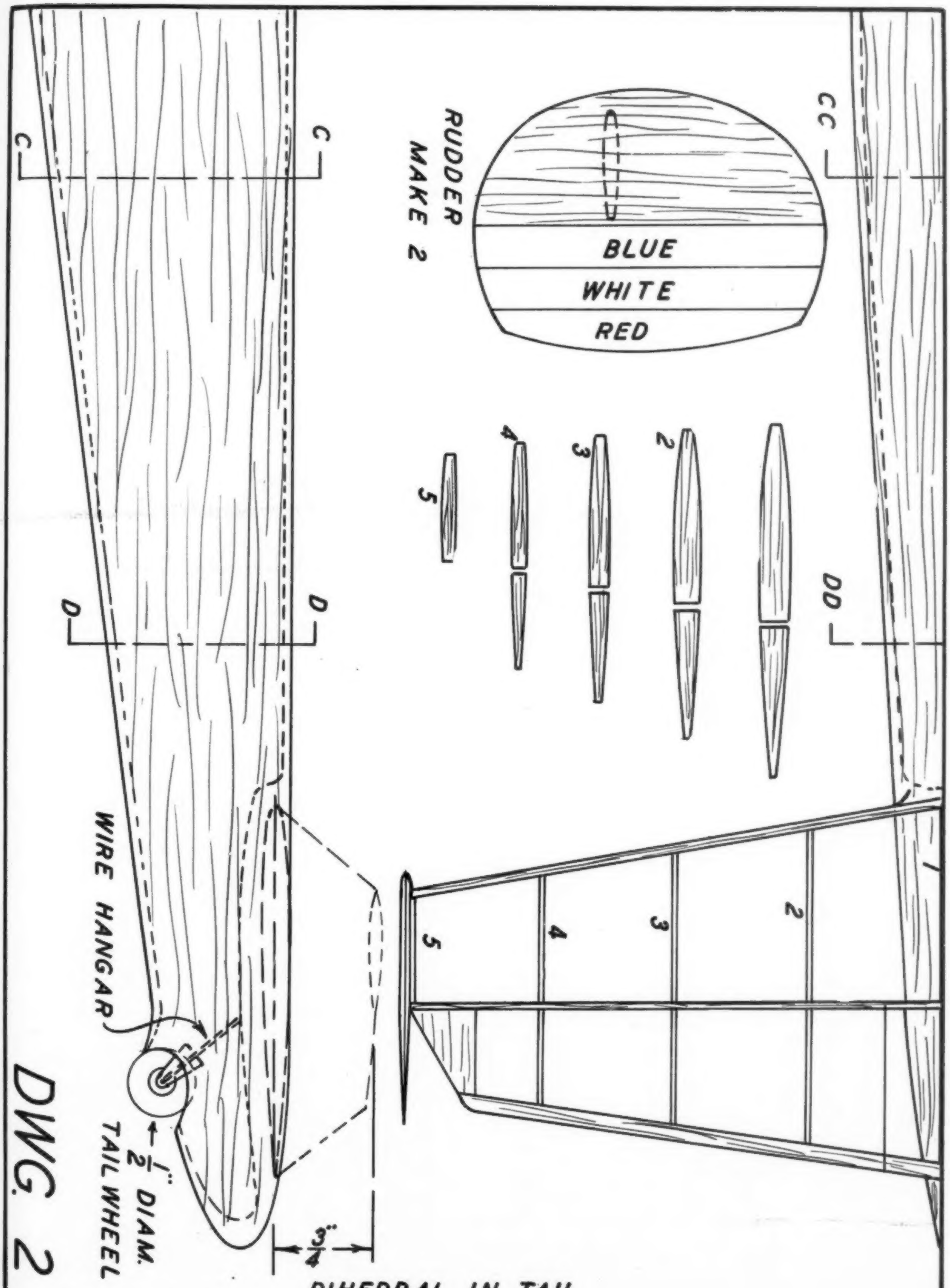
By holding the half of the body up to the light, you can easily tell where the wall is too thick. It is a good idea to get the inside smooth but if it is painted black, smoothness won't matter. (You'll notice that the author's model is painted black inside.)

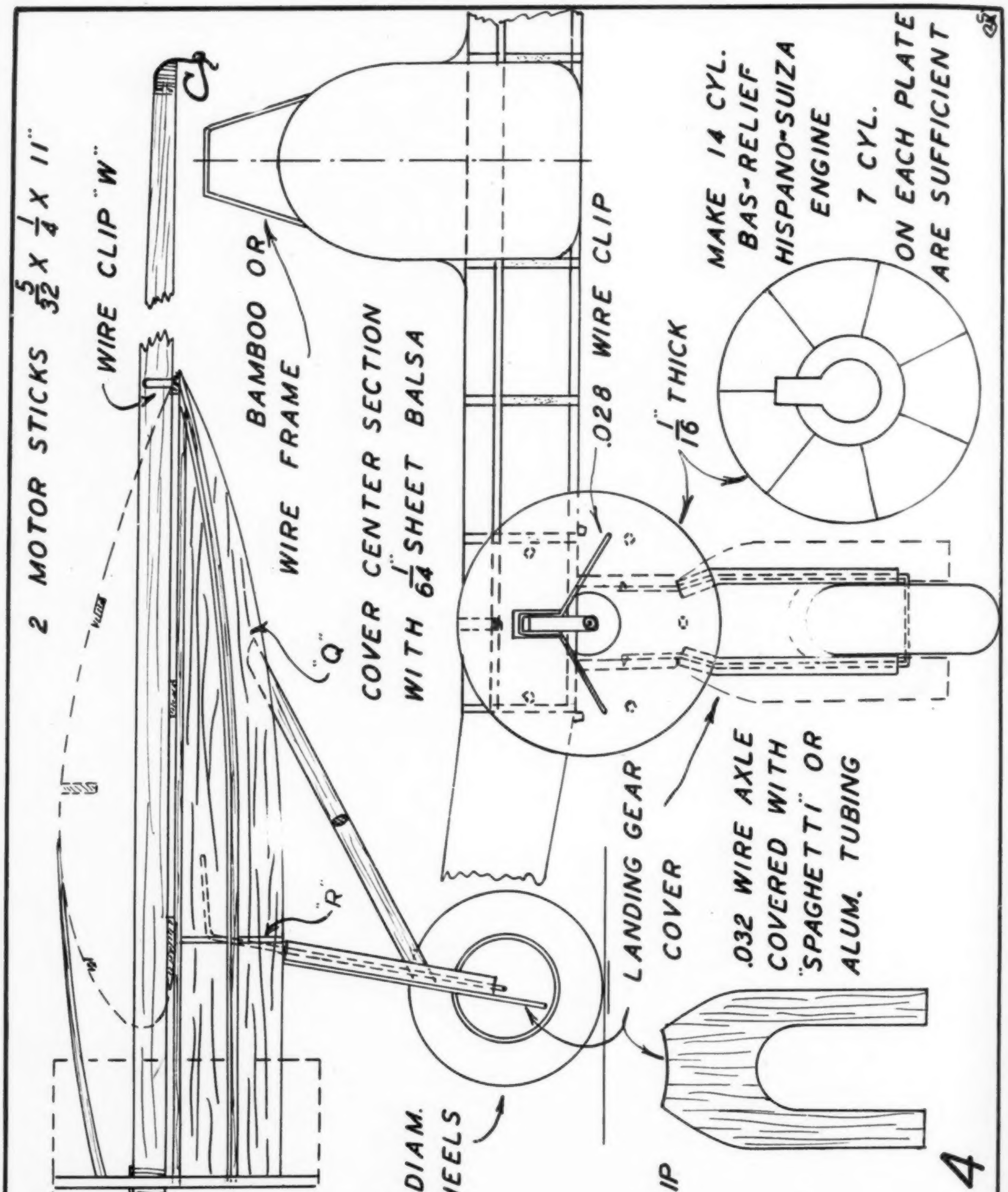
Now glue these halves back together, only make it a very secure job this time and then give the shell two coats of clear dope with a light sanding in between. The cockpit and tail-wheel spaces are now cut out and the edges should again be sanded. As long as there are no motors inside the body of this Potez model, you may want to finish up the cockpit arrangement by putting in chairs, etc.

While we are working on this part of the model, the tail-wheel may as well be installed. This wheel is a half-inch in diameter and can either be purchased from a model supply shop or carved out of 1/8" sheet balsa; a small bearing in the wheel will help as this wheel seems to get a lot of use and it is a good idea to keep it running freely. A piece of .028 music wire

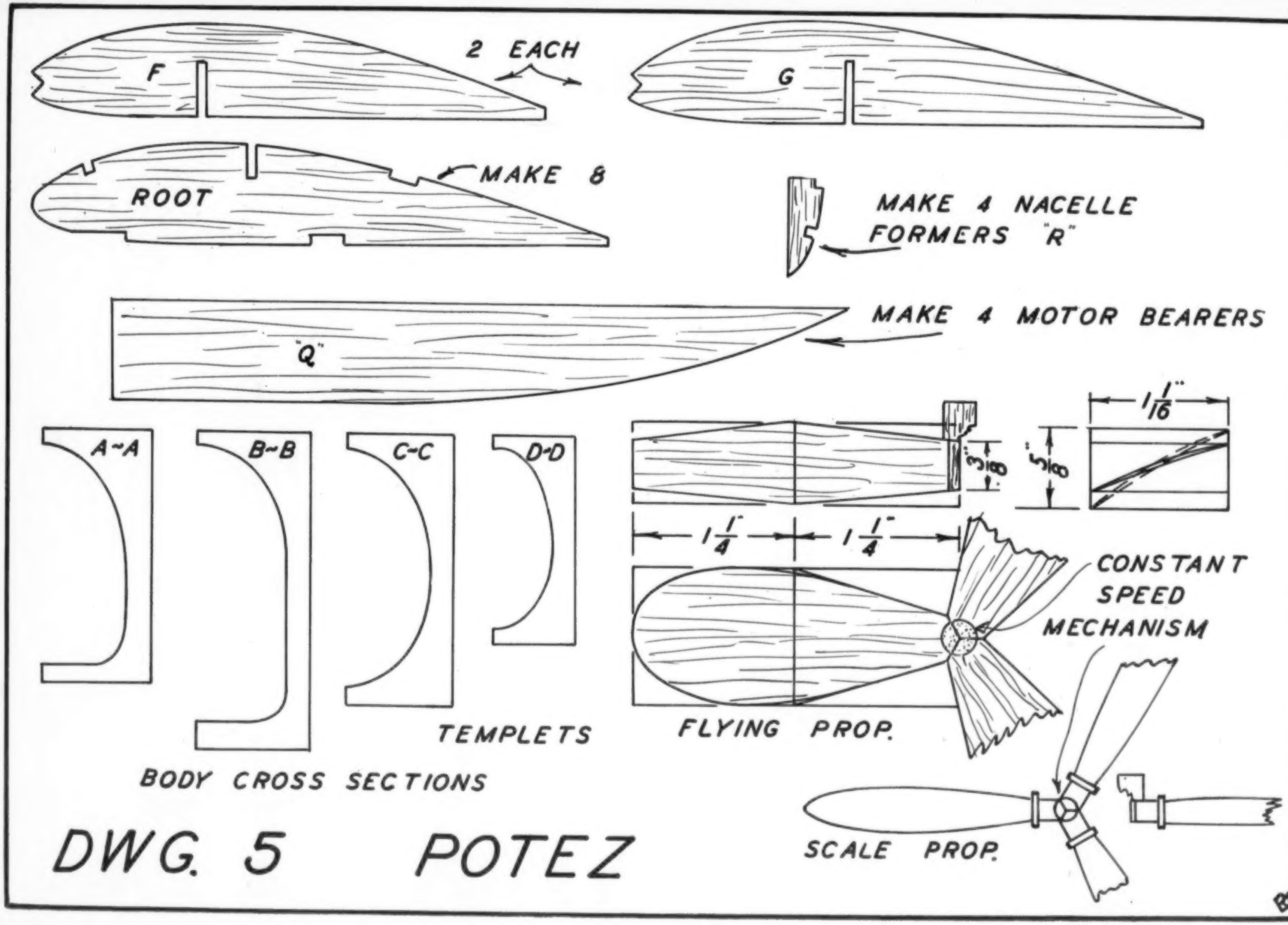
(Continued on page 38)


DWG. 1
AA
BB
FILLET
FILLET
MOTOR STICK CLIP
CUT OUT FOR MOTOR STICK
LIGHT CELLULOID
B
2" DIAM. ALUM. COWLING
1 1/8" DIAM. FOR EXACT SCALE
CRANKCASE TO FINISH OFF BAS-RELIEF MOTOR
NOTCH FOR MOTOR STICK
LEAVE NOSE SOLID
A
A
3


RUDDER
MAKE 2
BLUE
WHITE
RED
C
C
CC
D
D
DD
1
2
3
4
5
WIRE HANGAR
1/2" DIAM.
TAIL WHEEL
3/4"
DIHEDRAL IN TAIL
DWG. 2


2 MOTOR STICKS 5/32" X 1/4" X 11"
WIRE CLIP "W"
BAMBOO OR WIRE FRAME
"Q"
COVER CENTER SECTION WITH 1/64" SHEET BALSA
.028 WIRE CLIP
1/16" THICK
MAKE 14 CYL. BAS-RELIEF HISPANO-SUIZA ENGINE
7 CYL. ON EACH PLATE ARE SUFFICIENT
"R"
LANDING GEAR COVER
.032 WIRE AXLE COVERED WITH "SPAGHETTI" OR ALUM. TUBING
1 3/8" DIAM. AIRWHEELS
.028 WIRE CLIP "W"

DWG. 4


2 EACH
F
G
MAKE 8
ROOT
MAKE 4 NACELLE FORMERS "R"
MAKE 4 MOTOR BEARERS
"Q"
A~A
B~B
C~C
D-D
TEMPLETS
BODY CROSS SECTIONS
1 1/4"
1 1/4"
3/8"
5/8"
1 1/16"
CONSTANT SPEED MECHANISM
FLYING PROP.
SCALE PROP.
DWG. 5 POTEZ

Academy Of Model Aeronautics

A Division of the National Aeronautic Association

OFFICIAL MODEL AIRPLANE NEWS FROM ALL PARTS OF THE WORLD

SUPPORT A.M.A. PROGRAM **FLY SAFELY**

Low License Numbers Available On Request

The Licensing Division of the Academy of Model Aeronautics has made a survey recently of its gas model licensing set-up with the result that low license numbers will be made available to new gas model flyers for a limited time.

As might be expected in a hobby such as model aviation, a number of recruits enter the activity each year and after a year or so of participation, advance to other fields, many of them going into full-scale aviation. These folks who have been using low license numbers have signified their non-activity and have been notified that their license numbers are to be re-allocated to new recruits. Gas model flyers applying for the license and desirous of securing a low number should make a note of such requests on their applications and wherever possible their request will be granted.

Commerce Department, C.A.B., N.A.A., Model Aviation Leaders and Aeromodelers Approve A.M.A. Safety Program

The "Fly-Your-Model-Safely" campaign instituted by the Academy of Model Aeronautics to impress aeromodelers with their responsibilities has been commended highly by aviation leaders and model aviation enthusiasts.

The purpose of the campaign is two-fold. One objective is to educate the model builder to follow official regulations at all times so that his activity will not interfere with the operation of full-scale aircraft. The other objective is to acquaint the youthful air enthusiast with the desirability of following standardized procedure in his model airplane work.

In discussing the Academy's safety campaign, Robert H. Hinckley, Assistant Secretary of Commerce, said that: "You may be sure we are always glad to approve any effort on the part of an organization like the National Aeronautic Association to promote safety in aviation. We are especially glad when the initiative for safety comes from non-Governmental groups."

C.A.B. member, Edward Warner, noted aviation writer on technical subjects and himself a former model airplane flyer, gave the following endorsement: "Though I am not as acquainted with the development of model flying in recent years as I was over a long period in the past,—including the period in which I myself was a model builder—I have some appreciation of the problems that now exist. Model aircraft have so increased in size and power and performance as to have become a factor in air traffic and to have an influence on its safety.

"As I understand it, the purpose of the Academy of Model Aeronautics is to accomplish self-regulation, to insure that the development of model airplanes and the conduct of model competitions can be carried forward with a minimum of restriction yet without endangering either travelers by air or strollers on the earth. It is a purpose that one cannot fail to applaud, with a hope that its sponsors will have the fullest success in its realization."

The weight of N.A.A. was thrown behind the Academy's campaign by Gill Robb Wilson, who was recently re-elected president of N.A.A. Captain Wilson, State Aviation Director for New Jersey, in the September issue of NATIONAL AERONAUTICS, wrote: "With sincere interest, we of N.A.A. have been watching the progress of the Academy of Model Aeronautics and the splendid work its leaders and licensed members are accomplishing. You have proved beyond doubt that it was a wise move when official model aviation activity was turned over to the Academy and the future of American aeromodeling placed in the hands of active and interested leaders.

"We heartily endorse the program of the A.M.A. and its efforts to educate model flyers to their responsibilities. Much can be gained if everyone gets together under the Academy licensing program and follows the official regulations set up for competition and sport flying. More power to the A.M.A."

Writing to Colonel G. deFreest Larner, General Manager and Secretary of N.A.A., Jerome Lederer, Director of the C.A.B.'s Safety Bureau, indicated the approval by the Government of the gas model flyer's pledge used by the Academy in the following message:

"I am very much interested in the campaign which the Academy of Model Aeronautics is now conducting to acquaint model airplane flyers throughout the country with the need for flying their model aircraft safely.

"Model builders who follow your rules will learn the value of care, caution and attention to detail which has always marked progress in aviation. In addition, they will learn to obtain and heed the advice of more experienced people, which is also a very important step towards safety.

"That part of your pledge which requires special permission to fly model aircraft at airports and landing fields is especially important in view of the increasing air traffic congestion and the danger of having youngsters in the way of taxying airplanes.

"The inculcation of safety habits in the minds of model flyers while they are still young should encourage them to grow up to be fine pilots and a credit to aviation."

With thousands of entrants in the five hundred A.M.A. sanctioned competitions this year, it has been estimated by A.M.A. Contest Board Chairman, Bruno P. Marchi, that more than 2,500,000 model airplane flights will be made this year by modelers following the official regulations. When one considers the tremendous importance of this activity in making the nation more air-minded, one cannot help but realize the vast importance of aeromodeling to full-scale aviation.

The Academy, through its headquarters office in Washington, D. C. and the co-operation of leaders in the field, is going to increase the coverage of its safety campaign to the fullest extent possible so that every model airplane flyer in the country will be aware of the need for following official rules and flying safely.

Headquarters Log

Being a roster of the great and near-great who darkened the Academy's door during recent months.

John Cash of Nassau drops in . . . staying at Willard with Shoreham Acquatic Club which participated in swimming meets here in "The States" . . . 14 years old, John is a Junior High student and one of two gas modelers in the Bahamas. Harry Copeland of Syracuse, N.Y. . . . down to see C.A.B. officials . . . tells us of his 15 min. weekly radio program devoted to air news including modeling over WOLF each Thursday at 5:15. Lloyd Barclay of N.A.C.A. stops by with a new

(Continued on page 61)

The Physics Of The Airplane

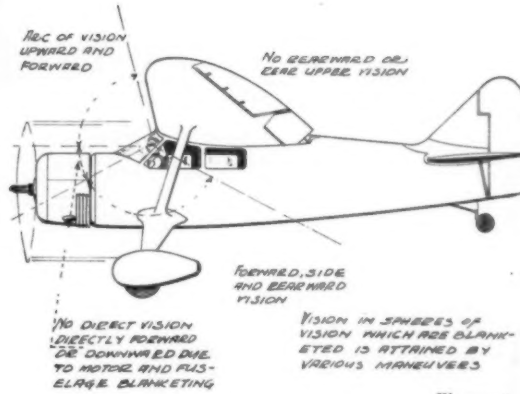


Figure 1.

The Influence of Light Phenomena On Aeronautic Science

By LT. JAMES P. EAMES and WILLIS L. NYE

ARTICLE 17

IN A manner very similar to that of Sound, which we have just concluded our study of, we may state that light is transmitted in the form of a wave motion. The medium which conveys the light waves is rather vaguely known to science as "the ether." It is beyond the scope of this article to discuss this question but for the sake of brevity let us assume that this medium exists. It is apparent that air itself is not a suitable medium for the transmission of light waves since these waves will penetrate a vacuum. This truth can be readily proved by means of a very simple experiment. Should one exhaust the air from a glass container of any kind, a vacuum is created within the vessel. Now, if any form of illumination, say, for instance a candle, be placed at the far side of the glass vessel, it will be clearly observed. When the air is again admitted to the container, the candle flame is not seen any clearer. As a consequence, we accept this as unrefutable evidence that light waves travel with equal facility through the atmosphere as well as through a vacuum.

The velocity of light is much greater than sound, in fact it is 892,800 times greater. We can recall our example of the pilot's gunning his motor when coming in for a landing. When standing beside the taxi strip at the airport, we observe the puffs of exhaust gases before the sound of the revved-up engine reaches our ears.

The velocity of light attains really enormous proportions, being of the order of 186,000 miles per second. Let us investigate a few pertinent facts which might aid us in grasping the full significance of the speed with which light travels. A ray of light is capable of rounding the earth at the equator more than seven times in one second! Although light can negotiate the distance from the earth to the sun in about 8 minutes, it requires light 4 years to travel from the nearest star back to the earth. Should some cataclysm of nature cause the North Star to become obliterated, the earth would still continue to receive light from this satellite for nearly 44 years! These figures also present to us some perspective of the immensity of the planetary system surrounding our earthly planet.

Light always travels in a straight line. We know this to be true by observing the path of light from an illuminated room into a darkened one beyond our own home. When an obstacle is presented to the passage of the light, such as the solid wall on either side of an opened door, the space behind the obstruction is screened from light radiation and is, as a consequence, pitch black. Thus, we see that light does not tend to bend around obstructing objects. This point is of considerable importance when the design of an aircraft structure for maximum visibility is considered. Two definitions become of paramount importance at this place in our discussion: transparent bodies are those which permit light to pass through them with so little loss due to absorption by the body that objects can be clearly distinguished through them; opaque bodies transmit no light whatsoever. A good example of the first type of materials include the plastics used for airplane windshields and transport airplane cabin "ports" such as Pyralin and Plexiglass. The aluminum shell sheeting, fabrics, and all other structural materials employed in airplane fabrication are classified as opaque objects. A sort of compromise is affected in the case of translucent bodies which transmit light, but do so very imperfectly thus making objects viewed through them somewhat indistinct.

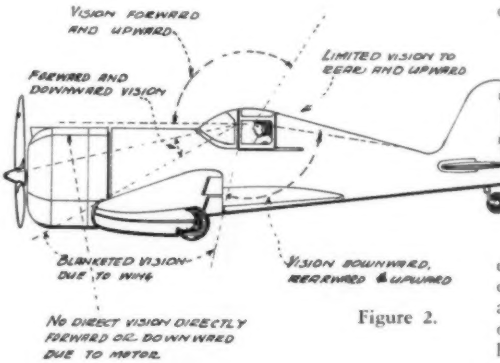
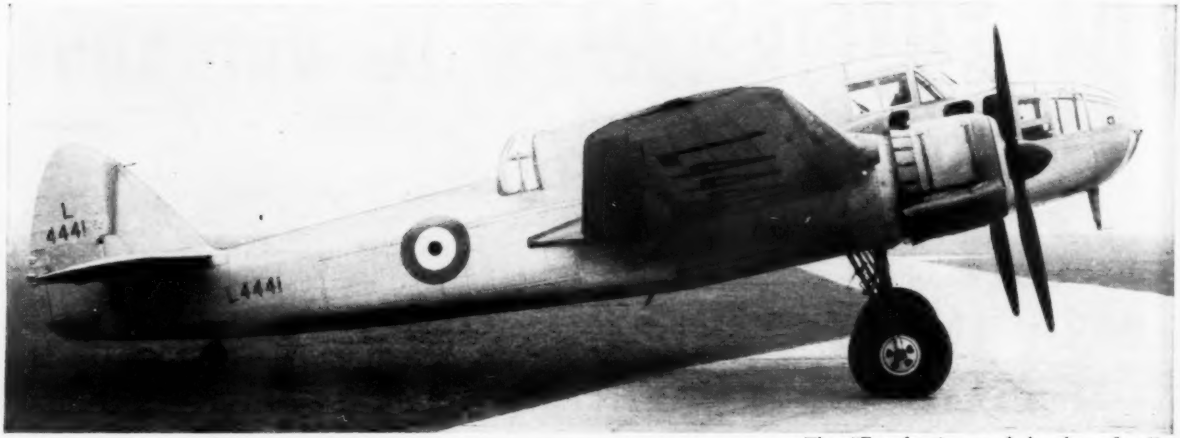


Figure 2.

There are many direct applications of the principle underlying the movements of light rays to the field of aeronautics. Optical instruments, such as sextants and octants for the navigating of aircraft over large bodies of water, aerial cameras, and the precision instruments containing finely ground lenses employed by engineers and designers for the microscopic examination of aircraft structural members, present a field in themselves and will be treated as such. Perhaps one of the most important relationships of our present subject to aircraft lies in the topic of visibility—the provisions of the fullest possible vision in all directions for the pilot and other occupants of the airplane.

Many of us have flown in airplanes the designs of which, from the standpoint of visibility, have caused us to harbor many unpleasant thoughts concerning collision in mid-air around a congested metropolitan airport and to think uncomplimentary thoughts about the engineer who was responsible for the design of the structure. If we could see well enough in a forward direction, our vision to the rear, or vertically upward and downward was badly hampered. With all justice to the designer of the aircraft, we find that the visibility was compromised. This condition is severe enough in civil aircraft which must operate over and about congested centers of population and from airports which enforce a definite schedule of traffic control. In military aircraft, the requirements of visibility represent a factor of paramount importance. Notwithstanding its excellent balance characteristics and the ease with which its maintenance may be accomplished, the radial engine of large diameter is a particular offender where a high degree of visibility is concerned. The power plant designers have taken cognizance of this difficulty, however, as is evidenced by their presentation of the double-bank radial engines and the renewed interest in liquid cooled power plants. Several projected engine designs of large output for military functions, we understand, of the radial type are underway which incorporate as many as four banks of cylinders. This will tend to permit the concentration of enormous power in compact engines which will not hinder visibility too much. In this way, a high horsepower output may be delivered with the engine overall diameter being maintained at a moderate value. The in-line type of power plant is again coming into its former realm of prominence in both the high and low horsepower output brackets. This type of engine affords excellent visibility, but possessing greater longitudinal dimen-

(Continued on page 56)



The "Beaufort" torpedo-bomber, first-line British fighting plane, fitted with the new Bristol "Taurus" sleeve-valve engines of over 1000 hp. (Thorell)

FLASH-NEWS

SPECIAL TO MODEL AIRPLANE NEWS:

ARMY.—More and bigger orders announced by the War Department will probably be the last this year under the National Defense Advisory Commission's contract allottment authority: 700 Ryan PT-16A low-wing, light primary trainers at a cost of $5,355,087; 650 Fairchild PT-19A of a similar type at a cost of $6,672,200; 770 North American B-25A twin-engine attack-bomber at a cost of $72,857,049; 1500 Douglas A-20A of a similar type (modified DB-7) at a cost of $141,320,610; 400 Douglas C-47 troop transports (purchase of option as reported in FLASH NEWS) at a cost of $37,462,121; 56 Consolidated B-24C four-engined heavy bombers (MODEL AIRPLANE NEWS, Sept. 1940 issue) at a cost of $14,861,342; 100 Fairchild PT-19B trainers at a cost of $1,038,000; 320 Consolidated B-24D heavy bombers at a cost of $85,800,000; and 2300 North American BT-14A (fixed gear) and AT-6A (retractable gear) trainers. This, it is believed, just about rounds out the United States Army Air Corps' re-equipment program.

Brig. Gen. Francis W. Honeycutt, Capt. George F. Kehoe, and Corp. Robert J. Schintz were killed in the crash of a big North American 0-47A three-place observation ship in a swamp in Noyes Cut on the Satilla River near Woodbine, Georgia. The plane was completely buried in the swamp mud and no effort will be made to extricate it, air corps officials announced.

Major-General Frederick L. Martin, formerly C.O. of huge March Field, Riverside, California, has been placed in command of the Hawaiian Division of the U.S. Army Air Corps, it was announced in Washington. Brig. Gen. Rush B. Lincoln, present C.O. of March Field, has been named Commander of the Air Corps Technical School at Chanute Field, Rantoul, Illinois.

Fort Benning, Georgia, has been named as a second school headquarters for the training of parachute troops and the newly-formed 501st Battalion of Parachute Troops recently participated in a mass drop in which 18 of their number poured out of two Douglas B-18A twin-engine bombers as a farewell gesture to a score of Latin-American military observers. Major W. M. Miley, battalion commander, is director of the school, which is cooperating with the Hightstown, New Jersey, school previously organized.

The 19th Bombardment Group (Boeing B-17B's) has been equipped with the famed Mayo Clinic oxygen masks for use in substratosphere bombing training, at March Field, Riverside, California.

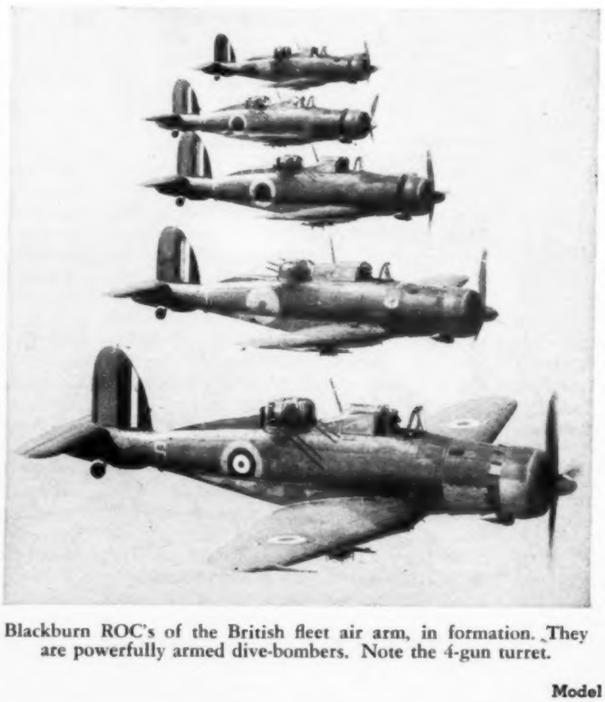
In order to establish a base within the Los Angeles area for the supply of equipment and acceptance of the hundreds of army air corps planes being completed within that area, the air corps has awarded a contract for the erection of buildings and basing of personnel at huge Los Angeles Municipal Airport, Inglewood, Home of North American Aviation, Douglas' El Segundo Division, Sperry Gyroscope Company, etc., the new base will remove the congestion of supply dispensation and aircraft test and acceptance now becoming a major problem in this teeming Southern California aircraft manufacturing area.

Under scattered political protest, Elliot Roosevelt, second son of the President, was sworn in as Captain in the U.S. Army Air Corps' specialists reserve on his 30th birthday. Captain Roosevelt was assigned to duty in the Procurement Division at Wright Field by Major General Henry H. Arnold.

Results of test flights conducted by Marshal Headle, Lockheed Chief Test Pilot on the sensational P-38 interceptor-pursuit (MODEL AIRPLANE NEWS, May, 1939 issue) have been made public in a statement by General H. H. Arnold, Chief of the air corps, to the effect that the twin-engine single-seater has a "top speed of better than 500 miles an hour!"

Five army air corps fliers were hurt, one seriously, when their Grumman OA-9 seven-place cabin amphibian twin-engine monoplane dragged a wing in the Hudson River, near

(Continued on page 71)



Blackburn ROC's of the British fleet air arm, in formation. They are powerfully armed dive-bombers. Note the 4-gun turret.

From the tip of its nose to the end of its tail... it's "All American"!

ALL AMERICAN

is taking "Top Honors" everywhere!

45" WINGSPAN **$1.00** **POSTPAID** or at your dealer

Although introduced to the public just one month ago, Scientific's "All American" has already won the acclaim of model airplane enthusiasts throughout America! And no wonder—for here's a plane that will capture your heart! Designed to fly, it has consistently made long, graceful flights of 2 miles and more! Its dashing, patriotic color scheme of red, white and blue has an irresistible appeal! Its many features include: removable tail assembly, removable and adjustable wing, removable nose plug unit, and adjustable tab rudder. Easy to build, too, even for a beginner. Complete kit, including detailed, full size plan is only $1.00 postpaid or at your dealer.

The "Bullet"

Just one of our four new "30" Models

50¢

Postpaid or at your dealer

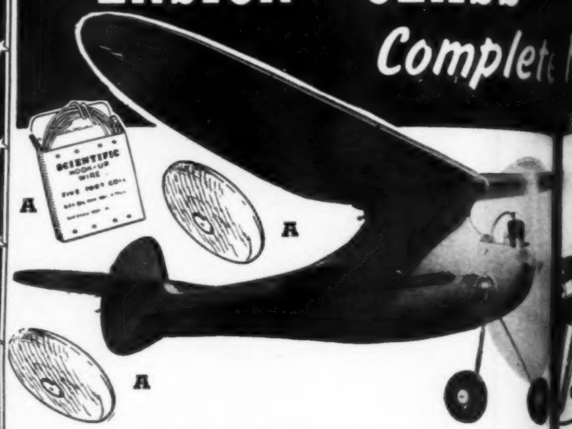
A streamlined model, designed for new flying thrills.

Send for Scientific's New 1941 Bargain Catalog........5¢

Another Scientific Scoop

"ENSIGN" CLASS

Complet



Complete Combination Includes "Ens

A—"ENSIGN" KIT....*Sells Regularly f* .95
COMPLETE including: HOOK UP WIRE, WHEELS, PROP and BATTERY BOX MATERIALS.

B—MODEL KNIFE ..*Sells Regularly f* .1

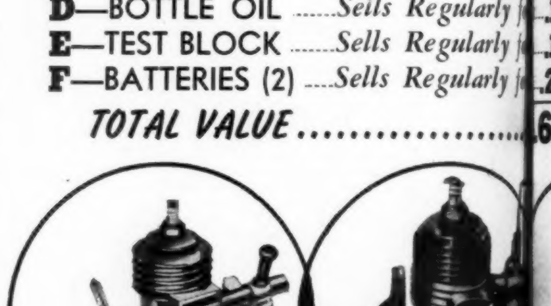
C—TIMER..................*Sells Regularly f* 1.0

D—BOTTLE OIL ....*Sells Regularly f* .1

E—TEST BLOCK ....*Sells Regularly f* .1

F—BATTERIES (2) ....*Sells Regularly f* .2

TOTAL VALUE.................. .6



SYNCRO B-30..............$6.95	BROWNIE ....
COMBINATION 3.95	COMBINATION ....
(Kit and Accessories)	(Kit and Accessories)
Complete with Motor...**$10.90**	Complete with Motor...$1

SCIENTIFIC MODEL

"GAS MODEL

218-220 MA-12 MAR

Building The Potez Twin

(Continued from page 27)

bent in the shape of a "U" will serve as a hangar for the wheel. This should be securely glued in the fuselage in the position shown on drawing 2.

A slit should be cut in the body so that the spar through the center section will pass through the body; also, several notches are cut in the bottom for the bottom spars of the center section. The fuselage is now ready for the paint job. The original machine is covered with sheet dural and is necessarily all-silver color, and the author's model has a silver body with yellow wings. The color scheme is entirely up to the builder, but silver is recommended.

Two coats of aluminum paint will do very nicely for the fuselage and the edge of the cockpit should be trimmed with black.

Center Section

The first step in the construction of this center section is to cut out eight root ribs from 1/16" medium balsa and notch all of them as shown on drawing 5. These ribs are assembled into the unit by placing them on rather hard balsa spars. Notice that the trailing edge is triangular in cross section and also that the leading spar on the bottom is somewhat tapered in cross section so as to keep the wing with the proper aerofoil.

Cut four motor bears from 1/16" medium balsa and glue them in the position as seen on drawing 4. Before we go any further with this particular unit it is advisable to cover it with 1/64" sheet balsa. This isn't absolutely necessary but it does improve the looks and it is recommended that you put the wood on with the grain running spanwise of the wing. Notice too, that an opening should be cut for the motor stick where it is marked on drawing 1, and there should also be an opening cut in the leading edge for the stick.

As each nacelle is an integral part of the center section, they should next be built and faired right into the unit. Two circular disks of 1/16"-thick wood serve as motor plates. The original model was equipped with ready-made 2" aluminum cowlings, so the size of the cowlings used regulates the size of these motor plates. Actual scale calls for cowlings 1 7/8" diameter. Cowlings of this size can be made by laminating layers of wood and carving them to the appropriate shape as previously described in the magazine.

At any rate, we have our motor plates; and next we should install the dummy 14-cylinder engines. Now for exact scale: 14 cylinders should be used on each motor, but as they are completely cowled, 7 cylinders on each motor look good and are comparatively easy to make. You can do as the author did, that is to take a ready-made celluloid dummy motor, cut off the cylinders and in turn cut them in two. The "half cylinders" can be glued to the motor plates and this will give you a very realistic looking motor arrangement. Of course if the builder feels exceptionally ambitious he can make 28 elaborate cylinders, but the fun is all his!

Fairing strips cut from 1/16" square balsa should now be applied to each nacelle and placed as shown on drawing 4. Former "R" is not necessary except if you want to cover the nacelle with paper. Leave the bottom portion between the motor bearers open so that the rubber will have room enough to unwind freely. Bend two .028 wire clips and glue them in place so that they will hold the sticks in position. Two more clips, "W", should be bent and glued on the trailing edge for the same purpose. The original model's nacelles were covered with thin-sheet wood and that method seems to work quite all right; so that will be your next step.

As long as we are working on the center section we may as well tackle the landing gear as the next project. It is very simple to make as there aren't many parts to it. We recommend 1 3/8" diameter air-wheels although other wheels of the same diameter may be substituted, but the air-wheels seem to work out very nicely. They are placed on .032 music wire which is then bent to the shape shown on drawing 4. When this is done, slip proper lengths of either "spaghetti tubing" or aluminum tubing on the wire so that it will look like a real landing gear leg. The free ends of the leg are secured inside the motor bearers in the nacelles by liberal use of glue and then the other struts of the undercart unit are cut and glued in place. The French have streamlined their retractable gear most completely and we do that by next cutting from 1/32" wood, landing gear covers which are glued in place; this detail is also shown on drawing 4.

Like the fuselage, the center section should be doped and sanded and then painted. It can now be glued on to the fuselage as shown.

Tail Unit

The ribs for the tail plane itself are cut from 1/32" medium balsa and the main spar is made in two pieces, each of which is tapered from 3/16" to 3/32" by 1/16" by 4". The leading edge is made from 1/16" square wood rounded on the leading edge, and the trailing edge is from 1/8" stock. Its cross section should be triangular. This tail plane is constructed in the same manner as any wing or tail, but don't forget to cut the spars so that they will join together at an angle to give the tail the proper amount of dihedral, which happens to be 3/4" in this case.

Making the rudders for this model are about the simplest part, and they are cut to the required shape from 3/32" sheet balsa of the soft variety. Sand them carefully to the streamlined cross section as seen on drawing 2. It is a good idea to paint them with the military colors before you mount them on the tail. The fin part of them should also be painted to match the fuselage and center section.

The dotted lines shown on them represent the position of the tail, and the twin rudders should be glued on in the proper position. Colored tissue seems to be the best solution for the coloring of the paper-covered part of the model, so cover the tail with tissue of the hue which touches the model builder's heart (or something). The tail can now be mounted on the fuselage, and you will find it necessary to cut out part of the body so that the tail will fit in nicely. Thin-sheet material worked in around this tail will fair it very well into the fuselage; this should be done so that our present structure will present a very stream-

STOP SEARCHING

For "Hard-To-Get" Items POLK'S HAS THEM!

4 WAY WRENCH 45c

RADIO CONTROL HDQRS. Circuits, Systems, Apparatus. Special booklet 35c.

NEW MIDGET AUSTIN SUPER LITE TIMER For Class 'A' or 'B'. 3/8 oz., 1 1/2" long. $1

BATTERY BOX For pen cell, intmd. and large 35c

ZIPROPS REDUCED Fast high climb 15c

CHARGER (Varnished Gumwood) 25c
SUPERCHARGER, deluxe super finished prop. 35c

"19" or "23" EXHAUST STACKS 35c

FLASH

New "41" Atom

It's the New Super Atom

$12.50 POST PAID

With Plug, Matched Coil and Cond.

BORE 1/2"
STROKE 1/2"
DISP. .097

60% More Power!

Cylinder porting increased almost 60%. Develops greatest 'power-to-weight' ratio ever achieved! Improved high compression cylinder. Super ATOM including plug, coil, condenser and tank weighs less than next comparable Class 'A' engine bare!

IMMEDIATE DELIVERY

Your Super ATOM will be shipped on day order reaches us. No waiting. Satisfaction guaranteed, each carefully block tested before shipping. Send check or money order and we send prepaid or C.O.D. for $2 deposit, balance (plus delivery) on arrival.

TRADE IN YOUR OLD ENGINES

TOP CASH ALLOWANCE AT POLK'S

Convert your old engine—regardless of age or condition!—into top cash allowance towards the purchase of a new one! You'll find Polk's unusually liberal. Bring or mail your engine for appraisal! You have an unlimited choice for selection!

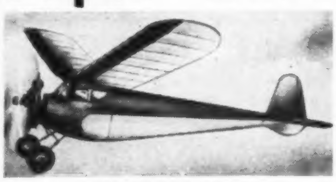
OHLSSON "60"	$21.50
FORSTER "29"	15.50
TIGER AERO	16.50
BANTAM "19"	16.50
DENNYMITE	15.85
"OK" New 49	12.50
BROWNIE	7.50
SKY CHIEF	6.95

'OK' TWIN—for radio control and heaviest flying models. $35.00.

SYNCRO 'B-30' $6.95

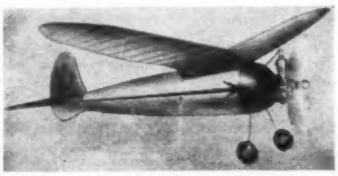
Super KITS

Acclaimed for superb performance, construction economy and building simplicity. Detailed 'step-by-step' plans in each kit!



BUCKAROO $1.00

37" wingspan, 180 sq. in., 5 ozs. Most popular 'buck' gas model today. Especially adapted for beginners. Simplified instructions included.



HAYMAKER $1.50

A knockout in Class 'A' field. Simplified, monocoque construction with removable nose unit. Sleek, graceful gas job combines appearance and performance. 33" span, 165 sq. in., 4 ozs. Slickest Garami design.

Pioneer 40" Wingspan $1.50

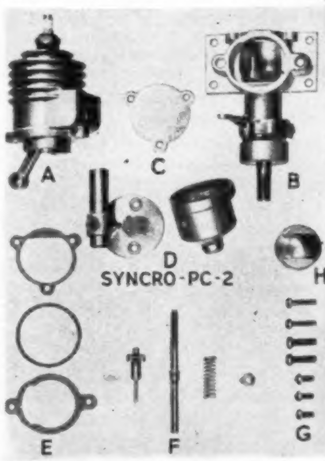
Features new type, easy-to-build technique. Super streamlined monocoque all sheet balsa fuselage is extremely rugged. Ideal contest, duration model. A Double-your-money value.

33" (4 1/2 oz.) WAHOO $1.00

The supreme in small, high wing mount Class 'A' contest designs. Zippy flight plus great strength. 180 sq. in., removable nose for timer, battery, coil.

BUILD YOUR OWN SYNCRO B-30

New PC-2 FACTORY KIT! BUILD IT WITH A SCREWDRIVER—IN A JIFFY! **$3.95 WITH SPARK PLUG**



Absolutely complete, factory build-up kit. All parts machined—ready to assemble with a screw driver! Every part included—just exactly as if factory built. Detailed assembly and wiring diagram included. Complete with Champion Spark Plug. (Note: Oil, gas, prop or coil, condenser not included.)

DEALERS! PC-2 kit opens a new, low-price engine market. Be the first in your territory to serve this group. Write for unusual dealer set-up.

SOLID SCALE MODELS $1.00

Choice AIRCOBRA (Illustrated) HAWKER HURRICANE, MESSERSCHMITT, GRUMMAN F3F2, CURTISS HAWK "75". Wingspans to 20". Kit contains cut to outline shapes, tail surfaces, insignias, metal paper, full size plans, alum. cowls

POLK'S factory distributors for American, Jr., Austin-craft, Air-craft, Bay Ridge, Boucher, Burkhard, Capital, Cleveland, Comet, Continental, Hawk, Ideal, Jasco, Marine Models, M C H P Kits, Megow, Scientific, Silksapan, Strombecker—Becker—and others!

POLK'S PIT PATTER

As in all hobbies—Polk's has pioneered in racing. Fans will find this the center for parts, accessories, supplies and help by practical experts. Whether in person, or by mail—you're certain of super service—try us!

DOOLING FRONT DRIVE Super streamlined. Knee action. Turn wing nut to remove motor. **$27.50**

Speed Chief $12.50
Whirlwind $19.50
Indianapolis $49.50
Silver King $15.00
Dooling Rear Dr. $23.50
All others incl. racing engines, etc.

RACE CAR WHEELS Bremer $4; Dooling $5; Gardner, Small $4.40; Large $5.00; 2 lge., 2 small $4.70; Banked track set $5.00; Track-Grip 2 1/2" dia. $2.25; Syncro, pl., $2.75; Speedway whitewall $3.75; Voit-standard $6.00; Deluxe $8.00 (Automatic fuel pump, 1/2 pt. cap. 60c; Dummy pump $1.00; Exhaust stacks from 85c).

VISIT POLK'S You ain't seen nuthin' until you've visited this hobby center! Give yourself a treat—today, soon—Gas engine catalog 6c; Boat-book 10c.

DEALERS! We are prepared to serve you—COMPLETELY!—in any hobby. Adequate stock of all standard lines, many exclusive specials! Consolidate orders, save freight, assure uninterrupted supply. Best factory discounts.

POLK'S Model Craft Hobbies 429 7th Ave.,

(DEPT. M-12) NEW YORK, N. Y.

OPEN DAILY TILL 6:30 P.M. THURSDAYS 9:30 P.M.

Diagonally opposite Penn R.R. Station. Modellers say this is the largest most complete hobby center in East. Come in—see for yourself!

lined object to us. Balsa sawdust and glue mixed up will serve quite well as a "plastic" type of wood and it can be used for the fairing around the tail and also around the tail wheel. The center section has to be filleted with the fuselage and this can be done in the same manner as the tail.

Wings

After building this much of the model the wings should hold no terror whatsoever for the builder; in fact they are quite simple. The ribs, there should be two of each shown, are cut from 1/32" medium material. The spar is tapered from 1/16" medium-hard balsa from 1/2" to 3/16". The leading edge is cut from 1/8" square wood and one edge is rounded so as to present a streamlined aerofoil. The trailing edge is made in the usual manner. Now the whole wing frame is assembled according to the drawings.

Be sure to glue ribs "G" on an angle to the spar so that the wings will have the proper amount of dihedral. The tips are built up from 1/32" wood sheet or they can be simply bent from thin bamboo. Like the tail, these wings are covered with colored tissue, using banana oil as the adhesive. One coat of dope will be sufficient to protect this covering and after this has been applied, characteristic French insignia are put on each wing. Strips of black paper put on the wings in the proper place give the appearance of ailerons. This position is marked on drawing 3.

The wings can now be glued on to the center section. They should be given the proper dihedral, which, by the way, is scale. This just about completes the model except for the propellers and their equipment.

Propellers

The two propellers are three-bladed and can best be made by carving three two-bladed props and then cutting them in two. After you have six blades, make them into two props with the blades 120 degrees apart. The size and shape of the blocks are seen on drawing 5; if you wish, you can cut six blades directly instead of carving the two-bladed propellers first. The props on the large ship are either genuine American Hamilton Standard products or built to their license; at any rate they are of controllable pitch and they have been experimenting with constant speed propellers, so on the model props you can put this dummy mechanism. It will add to the looks of the model. Scale propellers can be made if the builder wishes.

The two motor sticks are cut from hard balsa and measure 5/32" by 1/4" by 11" in size. The usual thrust bearings and rear hooks are installed and washers slipped on the propeller shafts and the model is about ready to go. Four or six strands of 3/32" flat rubber on each stick will do for the power. The amount used is dependent on the weight of the finished product, which should be between 3 and 4 ounces. To finish up our model, we next have to put on the cockpit enclosure which is made by making five frames from bamboo or wire and covering them with thin celluloid. Cellophane can be used but it isn't as satisfactory as the celluloid. Various other details such as machine guns and numbers can be put on at the model builder's own discretion. This completes our model and it is ready to take the air.

Flying

The model is exceptionally easy to balance as the motor sticks can be moved so as to shift the weight. The model should balance on the main spar of the wing. Gliding the model over tall grass will quickly show whether or not it is balanced. When all is in readiness, wind up each motor and let her off. If each propeller is right-handed, the motors will have to be wound separately with a mechanical winder; but with a right- and left-handed propeller they can be wound simultaneously. The model is a very good flyer as evidenced by the actual flight photographs and will be a very novel addition to a fleet of models . . . Good luck!

A Yank in England

(Continued from page 19)

across the face of the front bulkhead. The spar fittings are continuous through the width of the fuselage and are located at the mid-point of the fuselage side elevation. Cutouts for observation windows have been provided in the floor of the cockpit beneath the wing.

The cockpit is located directly above the wing and just aft of the firewall. The cockpit head-rest and streamlining aft to the rudder post is an auxiliary structure and of independent contour to the fuselage proper. Two large wheel wells have been provided under the leading edge of the wing within the fuselage to provide recesses for the retractable landing gear.

The wings are of the single-spar variety insofar as the main load-carrying member is concerned. Two small auxiliary spars both front and aft support the wing leading edge and aileron-flap combinations respectively. The wing tips are practically rectangular with the main wing plan since it is believed that the N. A. C. A. series airfoils used on the G-36A allow for little spillage amounting to any appreciable tip loss. The ailerons are small but are located far out in the wing panel. This moment arm coupled with high air speed makes their small size possible. The left aileron is equipped with a trimming tab controllable while in flight from the cockpit.

The flaps are of the split-trailing-edge type and run the span of each wing panel from the aileron to a point near the wing-fuselage bolting angle. They are vacuum operated, the system consisting of an engine-driven vacuum pump and a small double-action vacuum-operated valve located within the fuselage to which are connected the two arms of the flap torque-operating rods. Since the wing-to-fuselage attack angle approximates ninety degrees, little, if any, fairing has been employed.

The tail surfaces are of full cantilever design and are mounted on the cockpit streamlining false-structure atop the fuselage. This fairing curves directly into the vertical stabilizer to which is attached the horizontal stabilizer at a point midway off the fuselage. The rudder is of all-metal construction fabric-covered and is attached to the vertical stabilizer at

WINNERS—PART AND PARCEL!

Junior Motors Corporation has been manufacturing prize winning motors for many years. We wish to call attention to our Accessory Department which will supply you with precision-built parts for your model engine. The "Genuine Junior Motors Accessories" trademark is a sign of accurate, long-wearing parts.

$12.50 *Complete Ready-to-Run*

MODEL "D"

New and improved timer! New chrome molybdenum crankshaft! New micrometer needle-valve! New transparent gas tank! Motor shipped ready-to-run, complete with coil and condenser.

Our Repair Department is ready to give your motor an expert overhauling. Just ship it to us and we'll make a thorough inspection and send you a complete estimate.

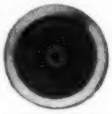
BROWNIE MODEL "E"

$7.50 *Complete Ready-to-Run*

Brownie is equipped with the finest ignition unit it has been possible to produce —a *multiple* spring *aviation* timer. The cam is made of coined steel—hardened and tough! The multiple spring is of finest pre-tempered Swedish spring steel—*there is no finer obtainable!*

GENUINE JUNIOR MOTORS ACCESSORIES

FLYWHEELS



Machined from High Grade Alloy Steel, free from flaw or defects. Balanced and Cadmium plated to prevent rust. Weights: 7 oz., 11 oz., 14 oz., and 6½ oz. (Brownie). Price........ **$1.50**

TIMER CAM

Hardened coined steel Cam. Price........ **40c**

IGNITION TIMER

Multiple spring positive acting type. Finest pretempered Swedish Spring steel. Operates with equal efficiency at 1,000 or 10,000 R. P. M. Price........ **$1.50**

HIGH TENSION LEADS

Finest stranded Belden Cord with high tension insulation and phosphorus bronze clips. Oil proof lacquered. Price........ **15c**

JUNIOR MOTORS COIL

Shockproof case, semi-closed magnetic core from Silicon transformer steel. Vacuum impregnated with wax of special dielectric strength. Price........ **$1.75**

STEEL CONNECTING ROD FOR MODEL D JUNIOR MOTORS

Drop forged one piece hy-grade special Alloy Steel. Price........ **$1.00**

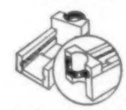
CONDENSER

200 Volts O.I.M.F.D. Capacity. Light metal clad unit with combination mounting and ground connection. Price........ **20c**

EXHAUST MANIFOLD

Easily attached to any Junior Motor, clip over exhaust ports. Keeps model free from oil, also excellent for cowling. Price........ **50c**

TEST BLOCK



For running-in your motor, or for handy use when motor is not in model. Makes wiring and mounting simple, and protects motor from slipshod clamping. Special features include metal strap for mounting coil, grooves for wire leads. Complete with crankcase screws and wiring diagram. Inside width 1½", outside width 2¼". Price complete........ **35c**

JUNIOR MOTORS CORPORATION

2545 NORTH BROAD STREET
PHILADELPHIA, PENNA.

three hinge points. It is of the balanced type with a composite hinge line. A controllable trimming tab is located at the trailing edge. The antenna mast is located on the hinge line atop the rudder to eliminate displacement during rudder movement. The elevators are hinged to the horizontal stabilizer at two hinge points on each half and are connected by the control torque-tube through the rudder center-line cutout. The elevators are of the balanced type. Both elevator and rudder edge surfaces are rectangular for reasons already explained in the case of the main wing.

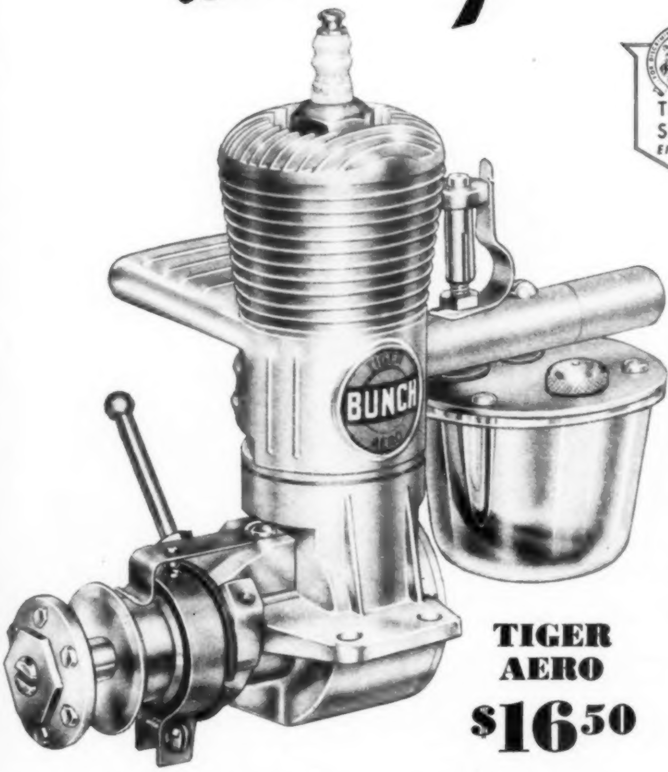
The landing gear is manually controlled being actuated by a rotating handle within the cockpit. The main landing gear support strut hinges at the middle-point and break inward through the action of the pull-strut operated from the cockpit. Two other hinging triangle strut assemblies route the various moving parts into arcs in such a manner that the entire structure folds neatly and compactly into the wheel recesses. The wheels themselves lie flush with the sides of the fuselage, small metal plates sealing the lower openings caused by the strut supports. A small streamlined housing projecting below the fuselage places the main hinge points at the lowest point of the fuselage to make complete retraction possible. The landing gear tread is 76½ inches. Hayes Wheel and Brakes assemblies of the drop-center rim type are used. The shock absorber is of the Bendix pneudraulic type mounted one to each landing gear assembly. The tail wheel is of the full swiveling, non-retractable and lockable type and is faired into the fuselage in a neat conical structure.

Power is supplied by a Pratt & Whitney "Twin Wasp Senior" model SGR-1830-S4C4-G developing 1050 horsepower at sea level. It is equipped with a two-speed supercharger which gears the propeller to the engine at 7.15:1 in low gear and 8.47:1 in high gear. Thus, in high gear power is limited to only 900 B.H.P. at sea level. In low gear the motor develops 1050 horsepower at 2550 r.p.m. at 7,500 feet. Maximum horsepower available is 1200 for take-off at 2700 r.p.m. This maximum power is available for only five minutes as a longer period would throw undue stress on the bearings due to excessive heat. Fuel consumption is .460 lbs/bhp/hr on 90 octane fuel. The engine weighs 1460 pounds dry, which is without lubrication or fuel of any kind. It has a diameter of exactly 4 feet (48 inches) and is 62.75 inches long, including the accessory drive gear box and supercharger housing.

This power is delivered to a Curtiss electrically-controlled constant speed all-metal three-bladed propeller. This propeller may be set to "Control" and manual operation of the pitch changing mechanism from "High" pitch (low engine speed used in cruising) to "Low" pitch (high engine speed used in take-off).

The oil temperature regulation has been divided into two separate core radiators mounted under each wing panel just outboard of the fuselage. These coolers are not controllable insofar as no shutters have been installed. Instead the automatic thermal-relief valves located within

The Contest winning TIGER



TIGER AERO

$16.50

CALIFORNIA STATE CHAMPIONSHIP

TIGER SERIES ENGINES

Take a tip from contest winners. The records of Tiger contest victories pile up! On the heels of Frank Cummings' 1st place Tiger victory at Los Angeles comes news that Tigers win 9 out of the first 15 places (totaling classes A, B, and C) at what is declared the California State Championship, held at San Bernardino, California. Think! Winning 9 out of 15 is more than *all* other motors combined.

From Arizona Bob Sligh reports still another Tiger victory . . . winning first place in the State contest at Tucson.

Here's Why You Should Re-Power With a Tiger

What was once a theory is now a proven fact. There *is* an optimum size. Tiger victories prove the finest, most powerful engines do win contests . . . but more than this, Tigers invariably power the practical 'just right' size airplanes.

If you plan to fly a model with 4 to 6 feet wing spread a Tiger will do the job best. In a word, the Tiger engine permits you to graduate from miniature class 'B' flying without building an expensive, time-consuming model as big as all outdoors.

ONLY MOTOR IN THE WORLD WITH ALL THESE FEATURES

PISTON RINGS PLUS LAPPED-IN PISTON *gives double the compression; longer life. First model engines to utilize the power-yielding properties of ethyl and high-octane gasolines.*

FORCE-FEED Lubrication *to special spiral machined bronze main bearing. Friction-free at over 10,000 R.P.M. Self lubricating cam.*

RE-ENFORCED CRANKCASE *EARS are ribbed to side of engine. Aluminum crankcase now virtually crackup-proof.*

TRANSPARENT FUEL TANK *with flexible fuel line and infallible Bunch fuel system. Long range carburetor needle reliable in verticle climb.*

OPTIMUM SIZE — *TIGER AERO class 'C'—neither miniature class 'B' or massive class 'C'—is rated 44/100 horsepower, outperforms both classes.*

ALL BUNCH MOTORS 45/100 CU. INCH DISPLACEMENT

BUNCH MOTOR COMPANY

6714 McKINLEY AVE.
LOS ANGELES
CALIFORNIA

the oil lines handle the cooling of the oil automatically through the use of by-pass valves.

The oil tank is located within the power plant compartment and consists of two formed aluminum shells spot-welded together and mounted onto the two top engine mount support tubes by tank straps to ease vibration. It has a capacity of 11 gallons with foaming space provided.

The fuel is carried completely within the fuselage just aft of the firewall. Three tanks are provided, the two main tanks being augmented by a small reserve tank. Total fuel capacity is 160 gallons which is usually divided into 120 gallons of 87 octane and 40 gallons of special 100 octane hi-test fuel used for take-off and in emergencies when maximum engine performance is demanded.

The pilot's cockpit is located high atop the fuselage where he virtually sits over the main wing spar. Through the use of an extraordinarily high windshield and enclosure structure his vision is unhampered from the pit. The windshield is of the baked curve "Perispex" plastic acetate sheet acrylin base material which is noninflammable and heat resistant. The main cockpit hatch slides rearwards on two roller races and consists of six separate glass panels riveted by tubular rivets to the hatch shell structure. The pilot's seat is adjustable a full 9 inches as are his rudder pedals. The instrument panel is located high within the cockpit just under the coaming on which is mounted the compass and gun-sight. Instruments include sensitive altimeter, turn and bank indicator, gyro compass, artificial horizon, rate of climb indicator, and compass in the flight group. The engine group is made up of a tachometer, manifold pressure gauge, engine gauge unit (including fuel and oil pressure, and oil temperature), carburetor air temperature indicator, thermocouple (for engine cylinder head temperature) and ammeter (for generator charging rate).

Only provisions for armament have been included on the export models to give the Royal Air Force all possible leeway in the installation of the numbers and types of guns they require. Two fifty-caliber Browning electrically-controlled machine-guns are fitted to fire through the propeller and the U. S. Army Air Corps has released its synchronizing unit to the R.A.F. for their use. This consists of two impulse generators mounted on the engine vertical drive pads, two impulse tubes to the guns and two trigger motors mounted one on each gun charging stock. In addition, provisions have been made for the installation of two carbon-dioxide controlled free-firing thirty caliber Brownings in each outer wing panel. Bomb rack fittings are also provided on the under side of each outer wing panel but are sealed by the sheet Alclad covering. In the event it is desired to mount bomb racks instructions have been given for the drilling through of these fittings and the bolting-on of the racks.

Radio equipment has been held up due to the extreme difficulties surrounding the receipt of this equipment from England. Therefore, provisions have been made for a Royal Air Force receiver and transmitter mounted on the right hand side of the fuselage and complete antenna equipment of American make has been installed. The main antenna mast is mounted on an extreme forward angle to throw the head of the mast far enough forward to permit the installation of the required length of antenna wire and to place the base of the mast far enough to the rear to insure clearance of the sliding hatch when in the open position.

Various items of equipment include two retractable landing lights located within the under surface of each outer wing panel, a spacious baggage compartment located behind the cockpit, two well-placed retractable-recessed steps permitting ease of entrance and exit for the cockpit, flat faced exhaust stacks located beneath the engine cowl and a faired tunnel air duct for the routing of air to the down-draft carburetor.

The Grumman G-36A has a length overall of 28 feet 10 inches and is 9 feet 3 inches high in level flight position. It has a wing span of 38 feet exactly. The wing area including the ailerons is 260 square feet, which can be accomplished even with this short wing span through the use of the square tips. The ailerons have an area of 11.48 square feet, the rudder 9.38 square feet, the fin 13.2 square feet, and the flaps 29.70 square feet. The horizontal stabilizer has an area of 30.43 square feet and the elevators 18.62 square feet.

The empty weight of the plane is 4649 pounds. It has an useful load of 1451 pounds, giving it a gross weight fully loaded of 6100 pounds. This weight figure places the wing loading at 23.5 pounds per square foot and the power loading at 6.79 pounds per brake horse-power.

The Grumman G-36A has a top speed of 353 miles per hour and a cruising speed of 305 miles per hour. The stalling (or landing speed) is 75 miles per hour without flaps and 68 miles per hour with flaps fully lowered. The powerful ship can climb 3450 feet per minute at sea level for the first minute and can hit 10,000 feet in four minutes. It has a service ceiling of 34,000 feet and an absolute ceiling of 37,000 feet, made possible through the combination use of the two-speed engine and constant speed propeller. With its fuel load of 160 gallons of gas, it has a maximum range with full load of 1150 miles.

Original orders by the British Purchasing Mission were for definite numbers of planes but after the collapse of France and the assuming of French aircraft purchasing obligations in this country by the British, present orders for the Royal Air Force stand in unlimited amounts and production and payments are continuing hand-in-hand until further notice. Some fifty Grumman G-36C's have been completed at this date but it is unknown just what quantity has been shipped and is now in England.

The Grumman G-36A will be attached to the Fleet Air Arm, which under normal circumstances would require their operation from British aircraft carriers. For this work the G-36A is admirably suited, having been designed from its inception

Buy—Build—Fly Models that Win More Compliments, Honors, Prizes than any Other Line in the World!

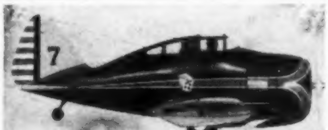
CLEVELAND

"*America's* FIRST LINE *of Flying Models*"

Playboy Sr.—Piling Up Record of Wins!

First in Cleveland! First in Akron! Second in Elyria! Second in Toledo! Fifth in New Phila! Sixth in Chicago Nationals! And many, many others! Here's Bill Schwab, and his mechanic, Sonny Wilhelm (at right) with the record-breaking Playboy Sr. that's winning contest after contest—the same model that twice broke the world's record within 7 days. Regular stock model which any modelbuilder can make. Get it, build it—get in "the money." Looks and flies like the champion it is. Class "C." Huge 80" span. Complete Kit GP-5017 (except power unit) only.............. **$3.95**

Wide Choice of SCALE MODELS



SEVERSKY FIGHTER. The well-known Army fighter. Span 24". Complete Kit SF-61..........$2.25
Span 16". Dry Kit D-61..........85c

BOEING P26A. Forerunner of most modern fighter planes. Span 21". Complete Kit SF-60..........$2.25
Span 14". Dry Kit D-60..........85c

Gliders *for Indoors & Outdoors*

CLEVELAND DARTS Builds 2 Class "A" Indoor Complete Kit E-5009 **25c**

CLEVELAND ARROW Class B Indoor. Span 18". Complete Kit E-5010 **25c**

CLEVELAND JAVELIN (above) Class B Outdoor. Span 20"—Complete Kit E-5011..... **25c**

BIG 7-FT. SPAN

CLEVELAND CONDOR Soaring Glider. Span 84". Class D or E. Complete Kit E-5019.......... **$1.00**

CLEVELAND EAGLET Soaring Glider. Span 48". Class C. Complete Kit E-5018.......... **50c**

Send 10c for Complete Catalog

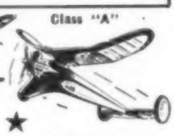
In addition to models shown here, this great catalog features scores of others, including big 32" models for 25c, Indoor and Outdoor Gliders, "Sticks," Microfilm, and Wakefield models, Ship Models, Race Cars, RR's, as well as thousands of all needed parts and supplies. Send 10c for your copy NOW—none free.

Big Variety of Gas Model Winners

Class "A"

Popular
BABY PLAYBOY

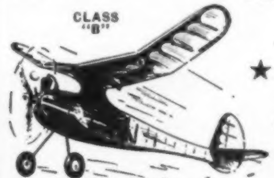
Span 33". Use either rubber, or Mighty Atom. Kit GP-5008 (complete except power unit) only.......... **$1**



Class "A"

Unique
"ITSY-BITSY"

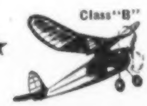
New monowheel design. Span 33". Kit GP-5016 (complete except power unit) only.......... **$1**



CLASS "B"

Fast-Flying
PLAYBOY JR.

Span 46". A flying beauty and a consistent winner. Kit GP-5006 (complete except power unit) only.......... **$2.50**



Class "B"

CLEVELAND CHAMPION

Span 48". Kit GP-5005 (complete except power unit) **$2.95**

CLASS "B"

Nothing Better for Gas Model Beginners

CLEVELAND CLOUDSTER Span 50". Kit GP-5004 (complete except power unit).......... **$2.50**

Class "B"

CLEVELAND FLEETSTER

Span 42½". Kit GP-5007 (complete except power unit) **$2.50**

SYNCRO - PC2

Partly Constructed
MOTOR KIT

CLASS "B"
All vital moving parts matched-mated and fitted at factory.
(No Coil—Condenser)
COMPLETE READY NOW! **$3.95**

CLEVELAND VIKING

Span 48". Kit GP-5020. Complete except power unit. Class A or B.......... **$1.50**

Rite Pitch and FloTorque Gas Propellers

15c & 25c gas propellers—all sizes to 15". Motors—Voit wheels—Austin Craft, Smith Coils and Condensers, etc., etc., etc.

ORDERING INSTRUCTIONS

If your dealer can't supply you, send check or money order—cash at own risk. Minimum order 50c. Include 15c for packing charge and postage on orders under $1.50. Shipments outside U. S. add 10%. (Remittances must be in U. S. Funds.) For P. P. Special Delivery in U. S. add 25c. (Ohio residents only add 3% sales tax.)

DEALERS—SEE YOUR JOBBER OR WRITE US.

CLEVELAND MODEL & SUPPLY COMPANY, Inc.

4508D130 Lorain Ave. ★ *"America's FIRST LINE of Models—Since 1919"* ★ Cleveland, Ohio, U. S. A.

HI FELLOWS

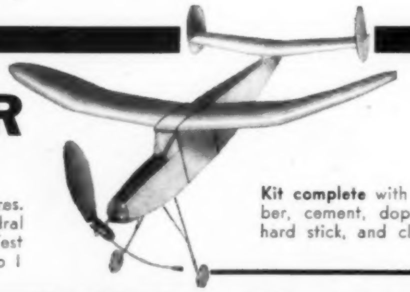
WHEN I TELL YOU THE NEW SPOOK IS HOT, I REALLY MEAN IT. IT HATES TO HANG AROUND ANYWHERE BELOW 1000 FEET. AND FOR A RUBBER POWER REVELATION, I RECOMMEND THE SUPER SNOOPER, LATEST IN EVERYTHING, AND YET IT'S A CINCH TO BUILD.

Barney

SUPER SNOOPER

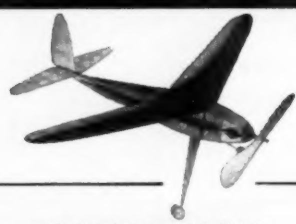
ALL THE NEWEST WRINKLES

This NEW model has truly natural flying qualities and latest features. Wing area 205 sq. in., meeting Wakefield requirements. Polyhedral Wing, Dihedral Stabilizer with Twin Rudders. A real cloud hound. Test flight lasted 50 minutes covering 7 miles, using 100 turns on a 3½ to 1 winder.



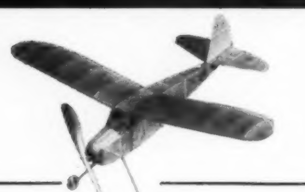
Kit complete with folding prop, 45 ft. rubber, cement, dope, lube, plenty of good hard stick, and clear plans. $1.50

RUBBER MODEL SENSATIONS!



RECORD WRECKER

Two consecutive flights of 56 and 49 mins. Wing span 26". An ace performer with free wheeling unit, and plenty of everything for construction. Add 10c for postage........................**50c**



PACIFIC ACE

Over 100,000 sold! Probably the best selling small model in use. Out-flies many dollar kits. Add 10c for postage..**25c**

SOARING GLIDER

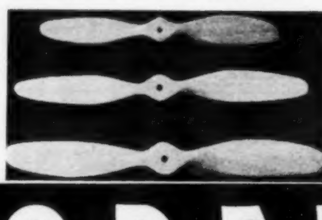
31½" Soaring Glider that is regularly turning in flights of better than 1 hr. Kit complete. Add 10c for postage.**25c**

BLACK BULLET

Sensational new small job. 30" Low Wing. It really travels. Kit complete. Add 10c for postage.................**25c**

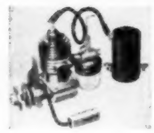
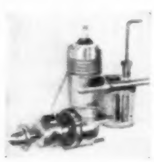
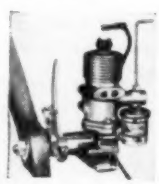
FAMOUS—DG—GAS MODEL PROPS

Have shown 20% to 30% more thrust in every test taken. Now you pay only 15c instead of 25c, due to increased production at our new much enlarged factory, 9", 10", 11", 12", 13", 13½", and 14"—each 15c



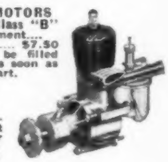
FREE→

MODELCRAFT MOTORS

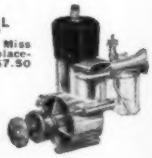

BROWN Class "C"
Model "D" $12.50
Model "C" $18.50
Model "B" $21.50
Model "M" $16.50

OHLSSON "19" Class "A" .19 Displacement. Just right for Miss Tiny $14.50



JUNIOR MOTORS BROWNIE Class "B" .29 Displacement.......................$7.50 Orders will be filled in rotation as soon as deliveries start.

OHLSSON "23" Class "B" .23 Displacement. Just right for Sky Baby $16.50

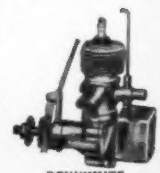


MADEWELL Class "A" Perfect for Miss Tiny. .14 Displacement $7.50

OHLSSON "60" Class "C" .60 Displacement For Your Spook 72" ..$21.50

SKY CHIEF Class "C" Displacement 526, 1/5 H. P., Base 7/8", Stroke 7/8", weight 10 oz. with condenser and coil $6.95 Postpaid

"O.K." STANDARD Class "C" Displacement .604, Bore and Stroke .900 x .950 $16.50



"O.K." DE LUXE Displacement .616. Bore and Stroke .900 x 31/32 $19.50

ATOM Class "A" Bore ½"—Stroke ½", Weight 2 oz. $12.50

DENNYMITE (Illus.) DeLuxe Airstream, $17.85. Standard Airstream, $15.85. Airstream Unit without Coil and Condenser, $13.85.

★ MODELCRAFT ★

LARGEST SUPPLY HOUSE IN THE WEST ★ 7306 SOUTH VERMONT AVENUE, LOS ANGELES, CALIF.

two years ago in the navy XF4F-1 version as a carrier fighter. However, under present war conditions in which the British Fleet is anchored out to sea and is not actively participating in the Battle for Britain, the Fleet Air Arm has been functioning as an adjunct of the Royal Air Force and its duties have consisted mainly of spotting, reconnaissance and patrol. Undoubtedly, the Grumman G-36A will be used as a defending fighter at navy bases and shore stations. These military objections have come in for far more than their share of activity through the course of the last few months and it appears likely that the Grumman G-36A will see plenty of action and much will be heard from it.

Elements of Radio Control

(Continued from page 11)

center, and the feeders must be made of a definite size of wire with measured spacing between them for proper results. The data given in Fig. 1E show only one set of conditions; there are many other combinations of wire size and spacing possible. The reader is referred to the "QST" or "Radio" amateur manuals for data on other wire spacings and such details.

The feeder spreaders may be made of most any insulating medium, but wooden dowelling soaked in hot parafin is a cheap and easily available material. The spacing is 4" between wires and No. 16 wire should be used.

In most partable installations, the antenna is mounted fairly close to the transmitter and high enough to clear nearby objects such as people, autos, etc. Thus the feeders need not be very long; however, those shown in Fig. 1E may be any length up to several hundred feet with very little loss.

The same style of feeders is employed with the final antenna design we shall cover, the so-called "Johnson Q," seen in Fig. 1F. The "Q" part really refers to the method of matching the open wire line to the antenna proper, and if the arrangement is properly set up very high efficiency may be had. It is preferable to buy a ready-made kit for such an antenna as all insulators and antenna parts are included with very complete instructions. The antenna and "Q" bars are of aluminum tubing hence self-supporting, so that only a single pole is required.

This covers most of the popular and simple transmitting antennas. As pointed out, the verticals are by far the most convenient, as they may be fastened directly to the transmitter with no feeders or supporting poles required. The horizontals, on the other hand, are as a rule a bit more efficient. The latter may also be made of telescoping aluminum tube so that they may be quickly erected with a single light pole.

The length of so-called "half-wave" antennas is in reality a trifle less than a true half-wave and is calculated from the formula $L = \frac{467.4}{\text{fmc}}$ where L equals length in feet, and fmc equals frequency in megacycles. For operation on the 5 meter or 56 mc. band, an antenna cut for 58 mc. will work reasonably well over the entire band.

As a matter of fact, antenna length is not a cut and dried figure, but varies with many factors, including height above ground, type of feed system, character of any objects fairly close to the antenna (such as trees, metal roofs, wires, etc.) and other factors. Thus it is best to adjust the antenna individually for proper length, after having cut it to the theoretical length as described above.

Those vertical antennas which are fastened directly to the transmitter are particularly susceptible to this variation in length; most horizontal antennas are erected fairly well in the clear, and 10 feet or more above ground, and can be used successfully when cut to the theoretically correct length.

One simple means for determining the exact length of vertical antennas is simply by observation of the plate current meter while the antenna length is varied. Starting with the theoretical length, increase a few inches at a time and note the plate meter reading. Also try decreasing the length by small steps; the proper length may be noted at the point that gives the highest plate current reading. While following this procedure, the plate current will sometimes rise above the rated value for the tube in use. In such a case it should be lowered to the rated value by decreasing coupling; in the systems of Fig. 1A, 1B, and 1D this is accomplished by reducing the condenser capacity or moving the tap further from the plate or "hot" end of the coil; in Fig. 1C, 1E, and 1F the coupling coil should be shifted away from the "hot" end or simply moved slightly sideways out of the inductive field.

A good way to adjust the transmitter and antenna system for maximum is to use the radio control receiver as an indicator. A low reading milliammeter in the plate circuit allows the operation to be carefully checked. The receiver must of course be placed at a good distance from the transmitter, preferably 500 feet or more, with an assistant to check meter readings and signal back the results. Highest transmitter efficiency is of course indicated by lowest receiver plate current for receivers using the type RK62 tube. Changes at the transmitter will cause corresponding shifts in its plate current; the antenna coupling should be adjusted after each change to keep the plate current at a constant value, so that readings at the receiver end may be properly interpreted.

We might remark in passing that most experienced amateur radio men usually have decided preferences in antenna systems and for this reason will probably pass over the foregoing rather rapidly. It has been written however for the beginners, many of whom have gotten their amateur licenses primarily for radio control experimentation. It is indeed toward this class of reader that a good deal of the material presented in this series has been and will be directed. For the same reason duplicate equipment of various types has been described; thus, from the several transmitters mentioned, the inexperiencd can find one that fits his means and requirements.

Most model builders construct their plane first and test it thoroughly to remove all possible "bugs" before installing

PACK UP YOUR TROUBLES IN A KIT BY BERKELEY and FLY-FLY-FLY

For Your MADEWELL or ATOM Engine

BUCCANEER "36"

36" WINGSPAN

Designed for those who like real-plane performance in models. You will like its smooth take-off, fast steady climb and beautiful glide. What's more, she comes in for a real three-point landing every time; even in rough ground!

$1.50 P.P.

BOTH KITS INCLUDE

Silkspan Covering, Formed Landing Gear, Printed out wood parts, Clear Dope, Cement, Detail plans with special motor installation instructions, and all the other **Extra** features found exclusively in **Berkeley** gas model kits.

AMERICAN ACE "36"

36" WINGSPAN

For the first time, a real small contest performance gas model. Henry Struck, on the very first test flight of the ship pictured here, turned in a time of 1 min. 5 sec. with only a 6-second motor run. Will climb as fast as any other gas model, big or small.

$1.50 P.P.

BERKELEY GAS PROPS

8" to 14" DIAM.

AIR SCREW SPECIALS
Formerly 25c. Bass wood, smooth, natural finish props. — **15c ea. P.P.**

AIR SCREW DELUXE
A superior prop. gumwood, beautiful lacquer finish. — **25c ea. P.P.**

FLO-TORQUE PROPS
The most popular prop at the Nationals and used by most winners there. — **35c ea. P.P.**

P.S. TAKE DAD TO YOUR LOCAL HOBBY SHOP BEFORE XMAS.

TOPS the Whole Field

HENRY STRUCK'S 54" WINGSPAN

AMERICAN ACE

$3.95 P.P.

INCLUDING
Silk Covering
Rubber Wheels
Finished Prop

Everybody's raving about the new American Ace. Adapted from Struck's famous "New Ruler" gas model, the most popular ship at the 1940 Nationals and winner of three out of ten places. Designed for maximum performance with engines of .29 cubic inch displacement, it can be powered with any engine from .19 to .49 displacement.

- Removable Nose & Motor Unit
- Formed Piano Wire Landing Gear
- Printed Wood Parts
- Silk for Pylon and Wing Center
- Semi-Finished Wood Blocks
- Streamlined Rubber Wheels
- Carved Propeller
- Championship Berkeley Cement and Dope
- Full-size Plans

BUCCANEER "SPECIAL"

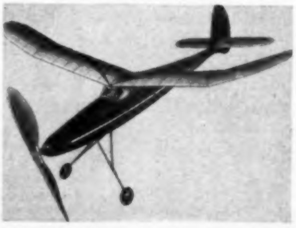
6 FT. WINGSPAN
3 LBS. COMPLETE

The MYSTERY Ship of Gas Models

Hundreds of model builders, experts and beginners alike, are shouting praises for the "Buccaneer-Special." The highest strength-weight ratio of any model airplane. A glide ratio that is amazing. Everything points to the "Buccaneer-Special" as your best bet in Class "C." Recommended for engines in .60 displacement class.

$5.95 P.P.

The kit has the completeness of all Berkeley kits, including Silkspan covering, clear and colored dopes, and a Berkeley "TIME-AIR" Flight Timer and Ignition Switch.



Henry STRUCK'S FLYING CLOUD

44" WINGSPAN

Propeller retracts flush into fuselage sides in glide. Winner of four places at the 1940 Nationals. Kit features stamped metal propeller fittings, rubber tensioner, formed wire landing gear, prop shaft. (Complete less rubber.)

$1.00 10c EXTRA BY MAIL

FLASH! 2 hr. 7 min. flight at Chebanse, Ill.

BERKELEY MODELS INC. 230 STEUBEN ST. Dept. M12 BROOKLYN, N. Y.

the radio control equipment. This is probably the ideal procedure, but even so it seems we may be overlooking a good bet in not using radio control as an *aid* in preliminary trials of a new model.

To be of any real benefit, it would probably be imperative to have at least two channel control, operating the motor speed and the rudder.

The trials should be conducted on a large level surface, possibly a flat open field, a body of water, or even a frozen surface. It is naturally necessary to have the control equipment in top condition, so it should be thoroughly tested at the maximum distance from the transmitter and with the gas engine running full speed. The model can easily be staked down so that it can't make a premature take-off.

When the radio control is working to full satisfaction, the model may be allowed to taxi over the surface at gradually increasing speeds until it has just enough velocity to take off and "hedge-hop." Naturally a continuously variable motor speed control would be ideal for this work. If a two step control, as described in Part III, is used the two speeds will have to be increased manually between each test run until the lower speed will taxi the model just under take-off conditions, while the higher R.P.M. will just lift it off.

The possibilities of such a system appear almost limitless and of course this is the exact procedure followed in large airplane practice, where the pilot first taxis over the field to get the "feel" of the ship before attempting full flight.

Be Original

(Continued from page 19)

women: No two hats alike is their motto. Different furniture. Different drapes. Change wallpaper frequently. Two-tone shades for automobiles.

This attitude is exemplified in their model work. Take Mary Walker of Elizabeth, N. J. We've seen her work all through the night and use up all her finger nail lacquer to give her outdoor commercial a paint job that differed from the rest. Same with Peggy Snyder of Los Angeles, one of the "Modelcraft" Snyders. Even if she was building a kit model, it'd have a personalized trim or color job; Barbara Maschin, of Westfield, Mass., is the same way. Just a little different model than the rest—a bit more original.

The maze of blueprints and red tape found in Washington during the present defense purchasing program cannot hide the fact that it's the airplane manufacturer with the original idea—offering a plane embodying new concepts of design and performance—that gets the official nod when orders are placed.

So what do you say? Let's take that plan your friend drew up for you and incorporate a few of your own ideas . . . knowing why you're making the changes, of course. Suppose the contour of the fuselage there by the landing gear is smoothed out, you'd get an easier-covering job, wouldn't you? And how about taking 6 inches off the span? Doesn't that aspect ratio look a bit too high if the model's going to be thrown around in the back of the family car and flown in wooded territory?

And so it goes. After improving someone else's designs—try a few of your own. It's a lot more fun and fame'll be more apt to smile on you. Go on, give it a try for a change—Be Original.

Frontiers

(Continued from page 23)

proofing.

While on the subject of aircraft plants, we might look into the new Vega factory now a-building. It will certainly be a huge structure and will put Vega up in a category with Douglas, North American, Martin, etc. Lockheed will look like a subsidiary of Vega instead of vice versa. "All haste" is the motto in the building program which will run something like this . . . and which incidentally is typical of every other new airplane plant under construction. As the painter is applying the last sweep of the brush to the last steel girder, the freight train will roll up to the door with the factory equipment. The employees will be hired and will become familiar with their machines as they are bolted to the floor. As the last bolt is tight they can start in and make the required part in time to be put on the first airplane as it is rolled out the factory back door! Time won't even have time to march. This same thing also holds true, practically, in the design of new airplanes . . . and you will certainly get your belly full of them in 1941!

Lockheed is building the largest commercially-owned wind-tunnel in the world, and here the aerodynamicists will be in their glory. It will be here that Lockheed will develop her new military speed demons, one of which may be a 500 m.p.h. "Tornado"-powered interceptor, as well as certain commercial developments. Lockheed has by no means disregarded the commercial transport during this war menace. Rumor has it that she will develop a large ship with about a 65 lb./sq. ft. wing loading in the not-too-distant future. Wing loadings have been mounting so of late that this is very plausible. When Douglas flew its first attack-bomber with a wing loading of about 30 lb. that was a big jump. Then North American publicly disclosed that it could produce one with 40 lb. Planes with these high wing loadings have now been thoroughly tested and the engineers have found, much to their satisfaction, that they can "load" their ship up even more. A year or two ago when new trans-ocean flyingboats were being considered designers thought they were startling the world when they predicted loadings as high as 45 lb./sq. ft.; but now they may be able to add to that figure 100%! The prospect of higher horsepower engines is the main reason.

But getting back to the Lockheed wind-tunnel . . . the large air chamber will be rectangular in plan view as well as cross-section to facilitate construction. The four corners of the chamber remind us of the usual pylon set-up at the National Air Races. When the air once gets going down the straightaway it bumps into a right-angled corner, and when it once more gets underway it makes another

right-angled turn. All this appears to be a "turn for the worse" because the wind is travelling at such a high rate of speed that bouncing into these corners produces an enormous amount of heat, enough to cook the aerodynamicist's next meal.

To remedy this, Lockheed will install water-cooled vanes to control the flow of air and cool it. What we would like to see, though, is a tunnel of circular plan view, as near as is practicable. All of 1,500 hp. will be needed to pump the air through the tunnel at a speed of 260 m.p.h. The engineers should be glad it is air and not water they have to pump. Big, the structure is 170 feet long by 70 feet wide. The windtunnel model's activities are registered by gauges on a large panel which are recorded with a camera.

Most people have seen high-speed interceptor pursuits hop into the air on the take-off in "nothing flat," but it is difficult to picture a large, medium-bombing plane doing the same thing. A large multi-engined airplane usually picks up speed gradually with a long run down the runway and then begins a shallow climb into the air. North American's new B-25 bomber breaks this precedent with pursuit-like performance and makes it the top-notch medium-bomber in the world today. During tests more area was added to the vertical tail units, which somewhat marred its gracefulness; but we hope this will be cleaned up on the production model as it is a fine appearing airplane with two big radial engines in nacelles under the high mid-wing. A nose wheel is up forward which gives the airplane the correct attitude for take-off and is therefore partly responsible for its quick acceleration. We will say that 300 m.p.h. is about its top speed, which is something worth writing about for a medium-bomber whose purpose is to pack away a mean, heavy load of bombs in its belly to drop on the enemy at some distant location.

Great Britain has not shown any signs of buying some of the B-25s, but it is most likely that she will as it would make a potential weapon in what might be the dissolution of Nazidom . . . maybe. The U. S. Air Corps ordered the B-25 in large quantities last year, but in the present new procurement program the air corps has purchased everything but medium-bombers at this writing. Perhaps as this is read contracts for medium-bombers, the greatest number ever, will have been placed . . . and North American and Martin should be on that list.

Another new high-speed military ship that was test flown soon after the B-25 was the Douglas A-20 attack-bomber that has all of the "zip" of the light-bombers of the Digby class being delivered to Great Britain. It very closely resembles the Digbys with slightly more vertical tail area (single rudder) and different engines. It too is of the high mid-wing, twin-engine type with tricycle landing gear and genuine single-engine performance. Though it is powered with two engines, the pursuit has nothing on it when it comes to maneuvers; and like the B-25 the pilot does not have to spend much time getting the ship under way. Great Britain retrieved as many of the Douglas DB-7s from France, a prototype of the A-20, as she could and is now receiving a number of the Digbys, which is the new name that will also be "tacked onto" the DB-7. That country has never had a production airplane with tricycle landing gear and such an airplane as the Douglas. Thus the pilots are rather surprised when they first fly the ship but have proved that they can handle it with undue success. They also get a "bang" out of its fast take-off acceleration.

Light bombing, yes, but will the A-20 really be put to ground-strafing? To this writer's mind, ground-strafing with a light assortment of bombs scattered hither and yon is the most effective means of offensive warfare, but on the other hand it is also a very dangerous means of passing one's time. We wonder if military pilots in time of war will be ordered to carry on this type of attack or will high-altitude bombing be resorted to entirely where the bombardier can sit in more peace and quiet, turning knobs and pushing buttons on his bomb sight, with a vague chance of hitting his target . . . and never actually knowing if he made a hit until after the war was over. Of course attack-bombing would be a daylight adventure to the pilot with most of the high-altitude stuff going on at night.

We must get on with more new ships as we have a barrel of them for this month, so here is some more "Frontiers" stuff: In the October issue of MODEL AIRPLANE NEWS we mentioned that the Beech Aircraft Corp. would be a likely father of the twin-engined military trainer in this country; and before the print dried on the copy, it was! Beech now has in its coffers $3,410,747 for 67 trainers of twin-engined design for the U. S. Army Air Corps plus a more recent order of $4,847,217 for 150 more trainers. No doubt they are a development of the Beech twin-engined transport and their fine little F-2 photographic ship recently acquired by our air corps. Most certain, each will be an expensive piece of merchandise for training purposes and must therefore be elaborate in its equipment.

However, Cessna, who is also located in Wichita, will go down in history as first, because this company is also the recipient of a twin-engined trainer contract which it got just before Beech. Cessna's will actually be a small ship similar to the twin-engined cabin sportplane it has been developing. (It is the first time we have used that word "cabin" in years; it looks like the open cockpit ship is the unusual

A REAL GASOLINE ENGINE $4.95

Everything is in the kit including Champion spark plug, coil, condenser, tank and cap, ignition wire, cylinder, piston, connecting rod, timer, crankshaft, all screws, nuts, bolts, simple illustrated instructions, etc. Every part is fully machined and finished. A SCREWDRIVER IS THE ONLY TOOL YOU NEED.

EXACTLY THE SAME PARTS THAT GO INTO THE G.H.Q. ASSEMBLED ENGINE.

Here is your opportunity to buy a kit of the famous G.H.Q. Gasoline Motor. ABSOLUTELY COMPLETE—ALL MACHINING DONE—READY TO ASSEMBLE. All you need is a screwdriver. No mechanical knowledge required.

A large bore, 1/5 H.P., engine at a lower price than any small bore engine.

AN ENGINEERING TRIUMPH . . . Never Before at So Low a Price!!

Indeed an engineering triumph—accomplished by outstanding G.H.Q. designers and engineers, who have constructed into the G.H.Q. motor everything that years of exhaustive scientific aerodynamic research could produce —geared to the highest possible degree of perfection. But more than that, the acid test . . . an overwhelming response. Thousands of users in all parts of the country are praising, recommending, and endorsing this scientific achievement. It seems as if everyone in America wants one. The most hair-raising thrill you've ever experienced will be yours with the G.H.Q. motor—actually one of the most powerful motors ever constructed. Has broken records for amazing performance.

30 MINUTES TO ASSEMBLE

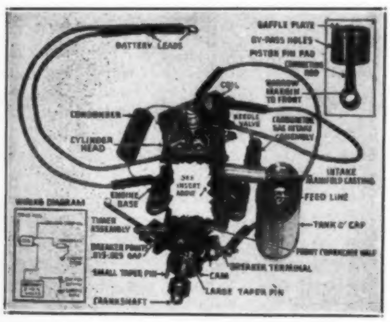
•

ALL PARTS WARRANTED

Imagine operating your own G.H.Q. ⅕ Horse Power gasoline engine—small enough to fit in the palm of your hand—yet turning up over 7000 revolutions per minute and powerful enough to fly model airplanes of from 4 to 10 foot wingspan, and propel model boats from one to six feet in length and midget cars that travel over fifty miles an hour!! There are also hundreds of other ways you can enjoy using this miniature yet powerful power plant—for small pumps, generators, compressors, blowers, fans, grinders and countless other experimental purposes.

Your G.H.Q. gasoline engine will be far more than just a toy for your spare moments. It is a scientifically constructed mechanical marvel that will thrill you with thousands of hours of pleasure. You will get a real kick out of controlling with your finger tip the surge of power your engine develops.

This engine has been tested and proven over the last seven years. Over thirty-five thousand of these powerful little G.H.Q. engines are now in actual daily use. Why not join the ranks of these hobbyists?



ENGINE IS COMPLETE and Ready to Assemble

Your engine comes to you with every part completely finished. Our factory-trained skilled mechanics, using the latest automatic precision machinery, have finished each and every part to the last detail. You merely assemble the parts in accordance with the few simple instructions given, using only an ordinary screwdriver, and inside of thirty minutes, your engine is ready to operate.

Not only will you and your friends have the thrill of seeing an engine ASSEMBLED BY YOURSELF operating, but you will gain a knowledge of gasoline engine theory and practice that will be a real practical value to you.

SPECIFICATIONS

4 Port 2 Stroke Cycle. ¾" Stroke. 15/16" Bore. 300-7,000 R.P.M. Bearing Surface, 1¼" Long. Crankshaft, 5/16" Diam. Rotation, Either Direction. May be run inverted. 1/5 Horsepower. Class C under NAA Rules.

DEALERS!

Get your share of G.H.Q. business! Write for new Discount Schedule.

This identical G.H.Q. Gasoline Engine Kit is also available in factory assembled, fully bench tested and ready-to-run form.

This comes to you already tuned up . . . ready to mount and run.

G. H. Q. "Ready-to-run" Engine $6.50

★

Send for FREE literature on G. H. Q. Gas Engine or 6c for Jumbo catalog.

★

HOW TO ORDER: Send Only $1.00

We ship Collect C.O.D. for balance.

For shipments outside U.S. send full amount plus $1.00 for packing, postage and insurance.

G. H. Q. MOTORS, Inc.

MANUFACTURERS OF

Miniature Gasoline Engines and Model Airplanes

40M EAST 21st STREET, NEW YORK, N.Y.

ORDER TODAY — 24 HOUR SERVICE

G. H. Q.'s SEVENTH YEAR!

Thousands of Satisfied Users! Read some of these testimonials on file with us:

J. B., Providence, R.I.—"A few weeks ago I received the G.H.Q. motor kit and it is running perfectly. I hope to write you soon and tell you about some excellent flights."

R. H., Prairie du Chien, Wis.—"Your motors sure can take a lot of abuse and knocking around and yet perform perfectly. I have had two in a period of about two years and have seen higher priced motors give less service and performance."

W. W. W., Russellville, Ark.—"I received my G.H.Q. Motor Kit and am very well pleased. I had motor together in 1 hr. 40 min. I will place order next week for G.H.Q. Sporster Kit."

W. L., Claysburg, Penn.—"A wonderful motor that thrills any air-minded person. Strong and neat looking. As good as motors costing twice as much."

A. K., Hillside, N.J.—"I still can't understand how you can put such a dependable and rugged engine on the market at such a low price."

E. T., Sayville, N.Y.—"Received my G.H.Q. Kit okay and am more than delighted with same. You've got 'em all beat for price and performance."

R. P., Hamburg, N.Y.—"I want to extend my personal thanks to G.H.Q. for their prompt service. The motor I ordered was received within 24 hours. Such service cannot be surpassed. I also want to say that I have the motor running perfectly. I shall do all I can to help promote the success of G.H.Q."

H. H., Midlothian, Ill.—"Motor assembled correctly and performs perfectly. I am fully satisfied."

NEW FEATURES:

Lightweight 3-Volt Spark Coil; Chrome-steel, one-piece, drop forged counter-balanced crankshaft; 1¼" Bronze Bearing; Uniflow Steel Piston giving extra-high compression; Champion Spark Plug.

THE G. H. Q. GAS ENGINE CAN BE USED IN BOATS, MIDGET CARS & PLANES WITHOUT ANY CHANGES

The G.H.Q. Gas Engine sold five years ago for $35. Over 7000 were sold at $8.50. Today, you can secure a vastly improved engine kit for only $4.95 or factory-assembled for only $6.50. How is this possible? Simply because we have invested thousands of dollars in tools, jigs, dies and equipment to produce the only mass-production motor in the market. All parts are uniformly perfect.

1940 SALES OF G. H. Q. ENGINES AND KITS TOTALED 15,000

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACTS OF CONGRESS OF AUGUST 24, 1912, AND MARCH 3, 1933

Of MODEL AIRPLANE NEWS published monthly at Mount Morris, Illinois, for October 1, 1940.

State of New York }
County of New York } ss.

Before me, a Notary Public in and for the State and county aforesaid, personally appeared Jay P. Cleveland, who, having been duly sworn according to law, deposes and says that he is the Business Manager of the MODEL AIRPLANE NEWS and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, Jay Publishing Corporation, 551 Fifth Avenue, New York City; Editor, Charles H. Grant, 551 Fifth Avenue, New York City; Managing Editor, Charles H. Grant, 551 Fifth Avenue, New York City; Business Manager, Jay P. Cleveland, 551 Fifth Avenue, New York City.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.) Jay Publishing Corporation, 551 Fifth Avenue, New York City; G. C. Johnson, 551 Fifth Avenue, New York City.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

JAY P. CLEVELAND, Business Manager.

Sworn to and subscribed before me this 25th day of September, 1940.

RUSSELL H. UNRUH,
Notary Public.

[Seal] (My commission expires March 30, 1941.)

these days.) These trainers will be of the advanced trainer type, the Cessna being designated as the AT-8 and the Beech as the AT-7 and AT-7A. North American received a 700 plane order amounting to a staggering $11,335,631, most of which will be for AT-6A trainers. The prototype of these airplanes was first designated as AT-1 until some person in the U.S. Air Corps discovered that there were advanced trainers ranging up to AT-5. Promptly the designation was changed.

Great Britain did a good job in retrieving about half of the NA-64 trainers ordered by France and has named them "Yales." After 50 hours in Fleets, the pilots take training in the fixed-landing-geared "Yales" before jumping into the "Harvards" for a third 50 hours. The "H a r v a r d s" are retractable-landing-geared airplanes of the North American NA-49, 61, 66, 76 and 81 models. On July 24th there were exactly 19,453 men in the Royal Canadian Air Force, most of whom were trained in "Harvards." The number is increasing at an average of about 1,000 per month.

Southern Aircraft's open-cockpit training biplane made its debut last month while Spartan received its first order for their new biplane from the U.S. Navy . . . $1,859,880 worth. The new Ryan ST training ships that are being equipped with floats may tote the new Menasco D-4 engine recently developed.

North American disclosed that during 1940 work was being done on several contracts such as NA-71 general-purpose-combat airplanes for Venezuela; SNJ-2 (NA-65) scout trainers for the U.S. Navy; NA-72 light attack bombers for Brazil and NA-68 single-place pursuits and NA-69 light-attack-dive-bombers for Thailand, formerly Siam. The pursuit is powered with a Wright Cyclone 840 hp. engine and is truly a compact little airplane of exceptionally good lines. The papers have given mention to another North American pursuit powered with an Allison engine and way over in Great Britain the magazine "Flight" gave the ship a write-up, including its designation number, NA-73. This, more so than even the NA-68, will be a spectacular airplane and both will be test-flown at almost the same time, probably before the trucks can get this copy on the newsstands. They will both be something "different."

Curtiss-Wright, after many many years, finally sold the U.S. Air Corps some of its trainers, 150 of them, no less. In the "good old days" of the Depression, when progress and coordination was something of the past, we dropped into Curtiss-Wright's New York office to get all the dope on their new sportplane, which was to be called the "Sparrow." There were about five sportsmen in the United States financially able to purchase such a plane at that time. The New York office frankly stated that it never heard of such an airplane; so we promptly told this office the glad tidings and later published photos and a three-view drawing of the airplane as proof that it existed. Three or four different models have been test-flown of this one- and two-place low-wing airplane, and it is reported that several have been exported, which have probably paid for

the extensive development of the little ship. The air corps order, which we think is for a similar design, should make the undertaking realize a good net profit.

Another undertaking that Curtiss-Wright put many years and lots of money into is its twin-engined transport; which in our estimation is one of the cleanest designed transports yet built. In spite of the fact that Curtiss-Wright successfully got the ship into the air, the airlines keep on buying Douglas DC-3 transports as if they could not stop the habit and it appeared as though Curtiss-Wright just would not get its 30-passenger job on the market until last month when the U.S. Army Air Corps came through with a very sizable order for 46 cargo planes at a cost of $12,410,116 which will be a development of the transport. Curtiss-Wright, needless to say, was very pleased at receiving the order . . . especially for the fact that $19,688,287 worth, or 540, pursuit planes went along with it!

As we put on our roller skates to hurry home for dinner more news filters in; such as—Howard Hughes' new pursuit plane now well underway will be very "hot" indeed. Curtiss is about to test-hop her new low-wing XSB2C-1 dive bomber. Two new engine manufacturers, Tucker and Hermann respectively, have gained large contracts from the War Department for new high-powered experimental airplane engines. Harlow, in conjunction with Portfield, is building an all-metal lightplane. Brewster has new outstanding projects underway.

Powerful dive-bombers, superior in performance to types playing such tremendous roles in Europe's war, are actually in production for the United States Navy and are being delivered in quantities.

This was disclosed today when officials of the Douglas Aircraft Company announced these airplanes are rapidly coming off production lines under a substantial Navy contract.

Designed and manufactured at the company's El Segundo Division, the new craft, officially designated as SBD, boasts performance and armament which make it one of the most formidable in the air today. The SBD carries a crew of two, has high speed and exceptional range for this type.

In recent acceptance tests, in California and in the East, the Douglas dive-bombers are known to have established records considerably in excess of the figures generally attributed to the German Junkers "Stuka" bombers, as well as to planes of the same general characteristics in the service of the British.

War developments have demonstrated the dive-bomber to have a demoralizing effect in approaching bombing objectives at great altitude and then diving to attack with lightning swiftness.

The SBD is an improved version of the Douglas BT bomber, of which the Navy has a large number in service on aircraft carriers.

In addition to the contract under which deliveries are now being made for these new dive-bombers, additional quantities of similar airplanes for the Navy and the Army are expected to be ordered shortly, according to announcements recently

made in Washington.

The two Douglas divisions in Santa Monica and El Segundo, where more than 18,000 employees are now working three shifts, are producing modern combat airplanes for the United States government and for Great Britain, as well as commercial airliners for the principal airlines in the United States.

Speedy and powerful attack airplanes of several types are moving rapidly down production lines of the Douglas Company's plants.

Nearing completion at the Santa Monica factory is the XB-19 super-bomber for the Army Air Corps, the world's largest landplane. It is a huge, 4-engine craft, weighing 70 tons with a useful load capacity of 28 tons and a range of more than 7000 miles.

The Physics of The Airplane

(Continued from page 33)

sions, causes the pilot's cockpit to be located much farther back than conventional radial engine practice usually dictates. Again, visibility is compromised in this arrangement. The location of the main planes has a pronounced influence upon visibility characteristics of an airplane structure. The growing predominance of the low wing monoplane in both military and naval circles presents a forceful testimonial to the excellent visibility characteristics of this type of structure. The negative or backward stagger given certain types of biplane structures greatly improves their visibility characteristics. Figure 1 indicates the various angles at which adequate visibility prevails in a civilian high winged monoplane and a military monoplane. The areas of blanketed vision are indicated.

A topic which is closely related to that of visibility in airplane structures is that involving the selection of color combinations when finishing the surfaces of the airplane. This selection represents a well balanced compromise, between the requirements of visibility, durability and attractive harmony. The first two requirements are self-explanatory. The last mentioned factor, while not particularly applicable in the case of military aircraft, nevertheless represents a pertinent sales policy in cases where civil or commercial airplanes are involved.

Note for instance, the color combinations of army and naval aircraft at your nearest base or flying field. In maneuvers, the undersides of the structure is generally sprayed an olive drab, a gray or a dark shade of blue. These colors blend favorably with the sky or cloud formations, thus making detection of such aircraft by observation from the ground level or from any position beneath a most difficult matter. The indistinct color combinations in conjunction with camouflage make the details and type of plane very indistinguishable, a valuable asset to delude the military intelligence officers of the enemy. How many times have you heard the unmistakable roar of a large military engine only to look all over the sky before you have been able to detect the sleek army bomber or speedy naval fighter? This fact attests to the efficiency of well-selected color combinations of these types of airplanes. However, we look at the upper surfaces of military aircraft and note that they sometimes are painted a brilliant shade of orange-yellow. This combination of color presents excellent visibility from above and permits quick identification by friendly aircraft, as well as presenting ample evidence of the proximity of the airplane when several airplanes are maneuvering in tight formation. At airfields devoted exclusively to student pilot training, the entire airplane structure is painted this vivid hue of orange-yellow. This practice is a little more informative than is the tell-tale streamer tied to the strut of a student's training airplane. Much good work has been completed, both at our own army maneuvers and in various countries abroad in the field of camouflage. We can recount the effectiveness of camouflaged materiél in the last war. Now, with further improvements being manifested in the art, camouflaged airplanes are said to be practically invisible at the usual level at which flight operations take place.

With regard to other color combinations, a satisfactory degree of protection in strong sunlight can be obtained from green, dark gray, aluminum and the various shades of non-fading red. This feature is not obtainable in the light reds, maroons and purple shades which are particularly subject to fading. Dark blue, although possessing the favorable characteristics enumerated above, tends to pronounced brittleness. As a consequence, this color is generally applied over black undercoatings. Light blue, when subjected to prolonged exposure, tends to change its shade radically. The more extreme shades such as white, light grays and creams tend to become chalky after even short periods of use. This color deterioration under the action of bright sunlight explains why certain colors of airplane dope tend to fade and deteriorate after exposure to the bright sunlight. Aluminum seems to hold up remarkably well, as does yellow, and, as a result, many aircraft are colored this way for the precise purpose.

After due consideration of all possible color combinations, the range extending from orange-yellow to vermilion-orange has been almost universally accepted as including the most visible colors contrasting with land, verdure, sky and water. Many exhaustive tests were performed before this conclusion was reached. In addition to this highly desirable characteristic, they also possess a high degree of durability and resistance to fading. These features explain its wide adaptation to aircraft operations. These remarks concerning color can be applied to miniature aircraft, especially gas-driven models which may experience flight considerable distances and a vivid and distinguishable color would be an aid in easy recovery by the searching party.

The following table gives visibilities as attained by the various colors.

COLOR	*Range in Miles*
Red	3 to 3.5 miles
Green	2.5 to 3 miles
White	2 to 2.5 miles
Yellow	1 to 1.5 miles
Blue	.5 to .75 miles
Violet	.5 to .75 miles

The legibility of one color against the background of another is a feature which becomes of acute interest to the aerial advertiser. A complete table giving the legibility of all available color combinations is included below:

Order of Legibility	Decoration	Background
1	Black	Yellow
2	Green	White
3	Red	White
4	Blue	White
5	White	Blue
6	Black	White
7	Yellow	Black
8	White	Red
9	White	Green
10	White	Black

We note from the first table that red has the greatest range in miles for effective recognition. That is why they use red and green navigation light colors at the wing tips. It is also of interest to note at great distances that any color surface on an airplane appears to be a black speck and the color is not recognizable until the airplane flies within the range of effective vision and recognition. In air which has a haze content due to heat waves and convection currents, colors at a distance are further distorted and appear to be black. A calobar lense type of flying goggle cuts through this haze and permits colors to be recognized in their true nature.

A World Record Autogiro

(Continued from page 21)

this very fast and a waste of power, but an autogiro has an excessive amount of drag as compared to a tractor, therefore its thrust must be much greater to make up for this loss of efficiency. Also the prop must be much smaller to reduce the torque, which is a deciding factor of success or failure in the Autogiro's flight.

Motor Stick

Select a piece of light 1/64" plus, quarter-grained stock for the motor stick. Sand slightly, cut a piece 1-1/8 x 9-1/4" from the sheet and wrap around an 11/32" dowel rod after soaking thoroughly in hot water. Be very careful to get the seams straight and be sure the tube is not curved, because a curved tube would cause the motor to rub against the side of the tube and ruin the flight characteristics. Bake in a 350 degrees oven for ten minutes. An inclosed motor was used to eliminate all possible bending or twisting on the tube, which would cause the model to be very tricky in flight, also to cut down somewhat on the drag the model would have with an open motor. Put an additional 1/2" of tubing at each end of the tube to take care of any possible crushing due to rough handling. Cut a small notch 1/16" x 1/32" at each end of the tube for the front and rear plugs, to prevent the plugs from spinning around on the tube and to insure the right thrust adjustment of the propeller and the negative incidence of the tail.

Propeller

The propeller is made from a soft balsa block 7" x 1/2" x 3/4". This might seem to be a rather small prop for an indoor model, but a larger one would create too much torque and cause the model to be very unstable. Carve the concave side and sand it completely before starting the convex side. The prop should be about 3/64" at the hub and paper-thin at the tips. Finish sanding with 10 or 11-nought sandpaper, and rub the prop carefully with the back of the sandpaper for at least 30 min. to diminish prop resistance as much as possible. Insert the prop shaft, washers and front plug on the prop and cement the hook.

Landing Gear

The landing gear struts are two pieces of 1/16" x 1/32" tapered to 1/32" square, 4-3/8" long and slightly rounded. They are glued to the tube 1" from the front end with a tread of 3". The axles are 1/2" lengths of fine wire bent to the desired angle and glued to the sides of the landing gear struts. The wheels are 5/8" in diameter and made of film negative with a 1/32" square piece of balsa running through the diameter. The hubs are small strips of super-fine tissue rolled around a piece of wire slightly larger in cross-section than the wire used on the axle. A small thread of cement on the end of the axle is sufficient to keep the wheels on.

Tail

The tail boom is a piece of indoor

medium-balsa 1/16" round, tapered to 1/32" round, and 5-3/4" in length. The tail plug is a piece of quarter-grained stock 3/64" thick and 3/8" in diameter. The rear hook is made of .016 wire to insure a stiff tail setting. A small block of 1/32" x 1/16" balsa is cemented on the inside of the rear plug to hold the tail in position on the tube. The boom is set at 1/8" negative incidence. The elevator is very large to insure ease of adjustment on the model. A unique factor about this model is that the elevator has more area than the wing. The spars are four pieces of 1/32" x 3/64", tapered to 1/32" square, about 5 in. long and rounded slightly. The ribs are minus 1/32" square light balsa. There are 13 ribs on the elevator. The tips are 1/64" square bending stock and extend two panels in on the leading edge and three panels in on the trailing edge. Be sure that they are not warped. The rudder is made in the same manner, but do not forget to place the camber on for a right turn.

Rotors

The rotor mount is a piece of 1/16" x 1/8" medium-balsa tapered to 1/16" round, 3-1/4" high and streamlined to shape. A 1/32" brace is glued to the tube and extends at a 75-degree angle to join the rotor mount and give it the desired stiffness. A rotor hub 3/16" in diameter and 1/4" long is used. Drill a hole through the center of it and into the top of the rotor mount about 3/8" to allow the pin axle to fit. Glue one washer to the top of the mount, another to the bottom of the hub and still another to the top of the rotor hub, so that a free spinning movement is obtained. Drill three small holes in the hub at 120-degree angles to each other for the rotor blade butts. The blades have a flat airfoil and are 8-1/4" in length. The leading edges are a combination of 1/64" plus bamboo tapered to 1/64" square minus bamboo and 1/32" square balsa tapered to 1/64" square and glued together. *Be absolutely certain each rotor blade has the same amount of flex to it.* If this is not done very carefully, the model will not fly at all. The ribs and the tips are made of 1/32" square balsa. The trailing edges are made of 1/32" square balsa without any taper. Each rotor blade has 3/16" wash-out built into it in order to revolve. The vanes and vane brace are not cemented to the hub until after the covering is completed.

Wing

The wing is similar to the tail in construction. The spars are 4 pieces of 1/32" x 3/64" slightly-rounded balsa about 5" long. The tips are 1/64" square and extend two panels in on the leading edge and three panels in on the trailing edge. The ribs are 1/32" square light balsa, 12 conventional, and one solid one as shown on plate 2. This is to give the wing a secure mounting. The two inches dihedral in the wing is not put on until the wing is covered. Leave a "V" shaped notch at the center of the wing for the formation of the dihedral.

Covering

The entire model: wing, elevator, rudder and rotor blades, is covered with microfilm; light on the tail and wing and heavy on the rotor blades. Cover the elevator by applying saliva to the framework, placing it on a sheet of microfilm and trimming with a hot wire or acetone. Cement the elevator on and make sure it is not out of line. Cement the rudder on with 1/8" right turn. The wing is covered in the same manner. The dihedral is then cemented in and the wing is placed in position directly behind the rotor mount with 1/64" incidence built-in and one inch dihedral on each tip. Cover the vanes with heavier film and be sure they are washed-out equally after you cover them. Insert the butt end of each rotor blade into the rotor hub. The vanes must be spaced equally on the circumference, or 120 degrees apart. Put the 3/64" braces on the blades after sanding them round. See that each rotor blade has 1-1/4" dihedral in it. Check the whole rotor system for possible warps or errors, because the biggest trouble experienced in flying an autogiro occurs in the rotors or their mount.

Assembling and Flying

If you have conscientiously followed this building program, you are now ready to fly your autogiro. Clip a small straight pin in half and insert it through the rotor hub and into the rotor mount. Make sure that the rotor blades revolve freely by moving the model slowly up and down.

Apply a small amount of cement to the prop plug and to the tail plug. Place the prop and tail in position and hold until the cement keeps them in place without any support. You are now ready to glide the model. Hold it about shoulder high and gently drop without shoving forward; the model should glide rather steeply and to the right. If it does not, correct the setting until the desired results are obtained.

Take the prop and tail off by breaking the cement joint and dropping a well-lubricated 10" loop of 5/64" brown rubber through the tube. Place the prop back in position and give the model 300 turns. Put the tail on and gently launch the model by letting go of it in a shallow right turn. Your results should be a wide turn to the right with a slight gain in altitude. If the model dives, increase the incidence in the rotors or in the elevator. If it stalls, decrease the incidence in the rotors or the negative in the elevator. If the model falls off on a wing, then the thrust adjustment is incorrect or the wing, elevator or rotors are warped out of position. As you slowly increase the power, the model should climb in steeper right-hand circles with an appreciable gain in altitude. Those of you who wish to experiment further with your autogiro may remove the wing and decrease the elevator area 33%. You will find the adjustment difficulties increased, but the results *might* give your model greater duration. If you experience any building or flying difficulties, send your questions and a stamped, self-addressed envelope to the author.

New Planes from the Old

(Continued from page 9)

cluding the commercial model WACO-"N" utilize the three wheel systems.

The "Airacobra" is powered with an "in-line" motor reverting to a type first known to aviation; most of the early power plants had cylinders placed in a row rather than the radial type. The first Wright motor was designed in this fashion. Later the famous Liberty motors which powered the "Flaming Coffins" during the war used the same placement of cylinders in their design.

In the early days, however, they didn't design motors this way to get better streamline effects, they built them because that was the only type plane motor they knew how to build. It was not until several years after the first flight in 1903 that radial motors came into existence.

Today "in-line" motors supply power to some of the fastest planes in the world. The XFM-1, Bell fighter, the XP-39 pursuit, not to mention new bombers reported to be using them, are all powered with the in-line, cylinder-in-a-row motors.

Speaking of engines, the army's multi-place fighter, the XFM-1, is powered with two pusher-type motors, recalling that many of the early planes were pushers. The Wright Brothers used the pusher-type engines on their seaplanes and Glenn Curtiss powered his planes with these motors.

With the streamline age came retractable landing gears to cut down resistance, but even this feature dates back to one of the planes made by the Dayton-Wright company. Today this early retractable gear mechanism hangs in the museum at Wright Field and it still works. The plane which first incorporated the idea was a chubby little biplane designated as a fighter. The Wheels, which were large bicycle type, were pulled up into fuselage slots by means of a hand-crank and a bicycle chain. Objectionable feature was that the plane, being a single seater, did not enable the pilot to manipulate the wheel control and fly the ship at the same time—and in those days planes didn't fly by themselves as they will today.

By retracting the wheels on this early plane its designers claimed that it would develop speeds "up to 200 m.p.h. at an altitude of 20,000 feet." The ship actually did hit a top speed of 180 in tests which at that time was considered "very fast." It never got above 17,000 feet, however.

Most of the modern planes, bombers and airliners, are equipped with retractable landing gear systems. Nearest to the original idea, however, is the system employed on the Grumman amphibians and fighters. On these ships the wheels are "pulled" directly upward and fit snugly into "pockets" in the fuselages or hulls.

Designers have elaborated on the retractable gears to the extent that today there are many types. Some fold inward to fit into wheel slots in the wings. Others reverse the process and fold outward. Some fold backward and twist themselves into specially designed "pants" built in the wings; and others are "pulled" up into motor nacelles.

Whatever the method used, however, the principal desire today is the same that it was in the minds of those who conceived the idea—to give the airplane less resistance and greater speed.

Both the "Airacuda," multi-place fighter, and the "Airacobra" were designed to incorporate a 37-millimeter cannon as part of their armament. On the XP-39 the cannon fires directly through the prop shafts. Some reports hailed this as a "great advancement in airplane armaments."

During the war the French tried out such a device using a cannon which fired a one-pound shell through the propeller shaft. The shaft was hollow and rifled to give the projectile its required twist. The plane was used successfully at the

front although not proving to be very destructive because of the excessive vibrations which spoiled a pilot's aim.

Twin-rudders that are on all of the Lockheed planes, and the triple rudder combinations of the DC-4 and the Boeing Clippers, introduced something new to modern plane designs. But even these can be traced back to the planes which Glenn Curtiss and the Wright Brothers flew. On the Curtiss pusher planes the twin-rudder and elevators rested upon long "tail booms" which extended back from the wings. Lockheed XP-38 uses this method today.

Even the interiors of our modern air-liners with their wheel controls reflect the designs of years ago. The early "yoke" controls were used on the Curtiss Standard planes which employed a wheel to manipulate the ailerons.

The "early birds" thought of everything, and in most cases they had the right idea.

It's hard to find something NEW.

Academy of Model Aeronautics

(Continued from page 32)

recruit to the sport and to obtain a gas model license for latter. Lloyd is still a-building a new and better gas model autogiro (or so he sez). Tusten E. Stugard of San Antonio stops off on his way to the N.Y. Fair. He holds A.M.A. 9556; stops to tell us of splendid activity going on down his way. Richard S. Robbins of New York City stops by to say hello during his "cross country" trip for Polk's Modelcraft Hobbies. Sez model business is picking up, which is good news. Harold Kulick, official A.M.A. photog, barges in to see sights and photograph A.M.A. headquarters in action for magazine story. Driving new Chevrolet station wagon; very snazzy indeed. John Snook, Jr. of Johnson City, Tenn., pops up to apply for a leader membership and report on the state of activities down his way. John has had 80 hours of flying time. Carl A. Hopkins of Clarksburg, W. Va., and A.M.A. state contest director, reveals the fine job the Work Projects Administration is doing for model aviation in that state. From Cincinnati, Milton Spector jaunts down to the Capitol City from Atlantic City where he vacationed with the folks. The Cincinnati Albatross Birdmen are looking forward to another year of increased activity, he reports. Stanley L. Potter of Alexandria, Va., barges in to take out insurance coverage for his wife, one of his daughters and his father-in-law. The entire family builds and flies gas models with much enthusiasm; father and daughter hold pilot's licenses and do considerable flying. Mickey Rooney puts up at the Willard during his triumphal personal appearance at Loew's Capitol. Academy Headquarters being unfortunate enough to learn his room number, is deluged with young ladies of the approximate age of fourteen. Millions of them!

Contest Board Welcomes Suggestions

The new Contest Board of the Academy, which has been set up under the chairmanship of Bruno P. Marchi, well-known model airplane designer and flyer, is

anxious to know what model builders think of the existing regulations governing the flying of model aircraft in the United States.

The Board will also welcome suggestions for future regulations and extends an invitation to all aeromodelers to pass along their comments and proposals. Communications to the A.M.A. Contest Board should be sent to Academy Headquarters, Willard Hotel, Washington, D.C.

A.M.A. Sanctioned Meets

November 11—Moundsville, W. Va. Moundsville Hobby Club outdoor contest.

Boston, Mass.—J.A.L. meets on Nov. 2 and 16, Dec. 7 and 21.

The Gas "Champ"

(Continued from page 13)

1/2" strip tapered to 1/8" x 1/4" down the center of the fuselage. Between this and each longeron cement a 1/8" x 1/4" stringer. On the bottom is only one 1/8" x 5/8" stringer. On top is a 1/8" x 3/4" stringer tapered to 1/8" x 3/8" at the bulkhead in front of the tail assembly. Then put on the other two 1/8" x 1/2" stringers, which are also tapered to conform with the general shape of the body. Cement the stringers to all crosspieces and braces and sand them down to help assure a smooth covering job.

For the wing mount, take a block of medium balsa and trace the shape from the full-size plans to it. A coping saw is used to cut the outline and the sides are rasped out and then sandpapered to a regular and streamlined form. Next comes the battery box, which is in the wing mount to keep the weight high and give easy access to the batteries. Hollow out the wing mount so that two medium batteries will fit. In one end put a piece of straight brass and form a spring of brass for the other end for the contacts. The wires from the battery box go down through two drilled holes in the mount. About 3/4" from each end of the battery box drill a 3/16" hole and cement dowels all the way through for strength. The dowels for the wing rubber bands are 3/16" diameter and are put in at an angle to keep them from slipping off. Small gussets are also used on top of the wing hooks for strength. On top of the wing mount is glued 1/8" hard balsa, cross-grained. On top of this is cemented soft 1/4" sheet, tapered to 1/16" at the center, in which the wing sets. The wing mount is set on top of the crosspieces in the fuselage. These pieces should be well cemented several times. The 3/4" center stringer runs to the end of the wing mount.

The bottom part of the rudder is put on the fuselage next. It is made of 1/4" sheet balsa and when covered with silk to the longerons forms a good-looking fillet. The coil should go right behind the firewall and attached to the motor skids; while the condenser should be kept any place near the motor. The timer should be mounted behind the wing mount so you can easily get at it. Any good wiring diagram may be used, but be sure to use a good grade of stranded wire and have all the joints well soldered as there is no cabin in which to make repairs.

The nose blocks are the next step. One large block forms the bottom and the sides are cemented on. When dried they are carved to shape and a piece of 1/8" aluminum tubing is put in the bottom as an oil drain. The top of the nose block is made of 1/4" square balsa cemented on top of each other to form the curves and made to fit the motor as closely as possible so that there will be no large holes around it to spoil the appearance and streamline effect of the ship. The whole fuselage is given a good sanding job and is covered with silk to make smooth fillets and give added strength. Give the fuselage about ten coats of dope so that oil and gas will not seep through.

The Wing

The spar is 1/4" square hard balsa, spliced for the dihedral. The center section of the spar is filled in with 1/8" plywood. Use plenty of cement on this.

While the cement is drying, cut the ribs from 1/16" hard sheet, which are drawn full size on the plan. Mark off 2-3/4" spacings from the center out for the ribs and cut a 1/16" notch 1/4" deep in the trailing edge where each rib meets it. This prevents the trailing edge from turning up or down. Plane and sand the trailing edge to shape before cementing the ribs to it.

The next step is to make full size plans of the wing tip and trace it on 1/4" medium balsa sheet. After the wing tip sections are cemented and dried, fit them to the leading and trailing edges and main spar. Then put the tip ribs in. The 1/8" x 1/4" bridgework is put between each rib, on the spar, as shown in the plan. Cut out the false ribs and insert between each full rib. Now put the 1/8" x 1/4" strips between the main spar and trailing edge, starting from the center and working toward the tip.

After both halves of the wing are completed, cover the center section with 1/16" sheet. Before the final sanding give all the joints an additional coat of cement. Sand the leading edge and tips with rough, and finish with fine, sandpaper.

When covering the top half of the wing with silk, first cement the silk to the center section and draw it to the tip, but not tight. It can then be drawn down to the tip dihedral joint. An application of cement should have previously been put on the edge of the rib at this joint. Give the wing several coats of dope, thinned with acetone or thinner, which prevents heavy drops of dope from going through the silk and drying on the other side; thus spoiling the appearance of the clear portions of your color scheme. After the pores of the silk are filled it is all right to use straight dope.

When the dope has dried the wing should be blocked down to remove any warps. However 1/4" wash must be put in the left wing to overcome the torque when the motor is running; and the warp causes a drag when gliding which causes the plane to circle to the left.

The Tail

Note: when scaling the plans up the leading edge is two 1/4" square strips cemented together and the trailing edge is made the same way but with 3/16" sq. strips.

To form the leading edge place pins on the plan along the inner edge and bend one strip around them. Then apply cement to one edge of the other strip, bend this strip

around the first, and leave to dry. Do the same to the trailing edge.

Now cut the 1/4" x 1/2" spar the right length, taper, and put in place. Then take the 1/8" x 1/2" strips and put them in the places as marked. After they are dried in place carve and sand them to shape. Cut the notches in the ribs where the 1/8" top strips go. After they are in place the elevator should be sanded to the cross section shown on the plan.

Scale the rudder plan to full size, trace the trailing edge on 1/4" sheet balsa and cut out. Pin the leading edge, two spars, and trailing edge, to the plan and cement in the 1/8" x 1/4" ribs. The hinge is a straight pin pushed through the two 1/4" square spars. Sand the rudder as shown on the plan and cement to the elevator. Before covering make a former similar to the last one on top of the fuselage and cement it to the front part of the elevator. Then put a balsa fillet, with the same contour as the fuselage, along the bottom of the rudder. After the tail is covered give it about five coats of thinned dope. Cement a 1/4" x 1/2" gib near the front of the elevator to go between the longerons of the fuselage. Cement two other pieces near the back of the elevator which fit on the outside of the longerons. The rudder adjustment shown works well and slight adjustments are easy.

On one of these ships, powered with a Super Cyclone, it was necessary to add weight to bring it up to the minimum weight required. Therefore by adding wheel pants, we brought the weight up, improved the appearance of the plane and probably made it more streamlined. We did not find it necessary to use pants to increase the weight when using the Ohlsson "60," as this motor has less displacement than the Super Cyclone.

Flying

Take your plane to a field and test-glide it many times if necessary, until you get a long, straight glide. A circle which shows up in a hand-glide may turn out to be a tight spiral if continued for a length of time. But don't worry too much about your model gliding straight after the motor cuts; some unseen warp or adjustment will probably cause it to circle and after the first flight you can make adjustments to suit yourself. Since the accessories can't be moved the stalling or diving, if any, can be removed by changing the incidences on the wing.

We have built five ships of this type and all flew fine on the first flight, after getting them to glide perfectly by hand. Be sure you have the 1/4" wash in the left wing; and you may need more with the more powerful motors. On the first power flight slow the motor to half-speed and about a ten-second run. After the first flight make one adjustment at a time. Our ships have had many happy landings and we hope yours will have the same. Good luck!

GET your January issue at your news stand Dec. 8th—or better still—subscribe today! See page 1.

Model Designing Simplified

(Continued from page 17)

of the plane but enables it to take off, or contact the ground safely upon landing. Later we will see how the weight of the landing gear actually contributes to the stability of your craft. The sixth factor is the structure or that part of your aeroplane which holds all the other units together in their correct relative positions. No other structural parts than these are required for flying.

Now you come to the actual problem of designing your aeroplane. Taking it step by step, it is really quite an easy and pleasant task. The problem now is, to put all of these parts in their correct position relative to one another so that the aeroplane will be stable.

Start with the wing. This is the basis of your design. Suppose the wing span is to be 21 inches. This is the distance from one wing tip to the other, measured straight across. The cord or width of the wing should be about 1/7th of the span or 3 inches. This proportion has an effect upon the efficiency of the aeroplane and a cord of 1/7th the span will satisfy all requirements. The wing is shown in Figure No. 2.

The next step is to place the tail surfaces in the right position relative to the wing. The simple rule which will hold true for nearly all aeroplanes is to place the stabilizer or (horizontal tail surface) so its center is a distance from the center of the wing, equal to 3 1/2 times the wing cord. Thus, in the diagram you will see that this distance is 10 1/2 inches.

Now the vertical tail surfaces or fin must be located. This may be placed directly over the stabilizer or partly over and partly beneath it. (Shown in the side view of Fig. No. 2). Thus its center is the same distance from the wing center as the stabilizer, namely 10 1/2 inches.

Though the position of these two surfaces is important, it is necessary that they shall be the correct size. If you copy a full scale aeroplane and make the model tail surfaces the same size, relative to the wing, they will be entirely too small. Building models with the same proportions as large planes has led many beginners astray. The tail surfaces of a model should be nearly twice the size of those of a large ship in relation to the wing area.

(1) The stabilizer should have an area equal to one-third of the wing area. The area of the wing will be approximately 60 square inches when properly shaped, thus the area of the stabilizer should be about 20 square inches. To give it the right proportion, make its length or span about four times its width or cord. A span of 9 1/2 inches and a cord of 2 3/8th inches will give the proper area when the stabilizer tips are rounded according to conventional practice. (2) The area of the fin should be equal to 1/9th the wing area, which is 6 2/3 square inches. Its height should be about 1.4 times its width. If it is 3 3/8 inches in height and (2) inches wide with the tip rounded as shown in the Fig. No. 2, it will have approximately the correct area.

Though the tail surfaces are the primary parts, which create stability, the wing must be formed in such a manner that the craft will recover its balance if it rolls or turns over sideways. It should be creased at its middle with each wing tip raised above the center, a distance of (1) inch for every foot of span. The span is 21 inches or 7/8ths of two feet. Therefore, each tip should be raised twice 7/8ths of an inch or 1 3/4 inches above the center.

The angle formed by the two half wings or pinions is called a dihedral angle. The wing with the correct dihedral is shown in Fig. No. 2.

Now, we have two unattached surfaces which a structure must connect and hold in proper place: the simplest form is a straight stick.

The tail planes should be attached to the rear end and the wing, ahead of the tail planes, the proper distance. If the stick should extend forward from the wing far enough to balance the tail without the addition of a weight on the front end of it, it obviously would have to be extremely long. We will assume that it extends forward a distance equal to 60% of the tail moment arm M, Fig. 1, or 6 5/16 inches.

Now you have an aeroplane capable of gliding flight though it has no power. Such a ship is called a GLIDER; plans are shown in Fig. No. 2. This airplane has the proper basic proportions except one important feature which must be added to make it stable longitudinally, or in a fore and aft direction: it must have a longitudinal dihedral.

This simply is the *difference* in the angle between the wing and the stabilizer. The stabilizer should be placed flat upon the stick having no angle relative to it. However, the wing should be attached so its front or leading edge is raised slightly relative to the top line of the stick. This is shown in the side view of Fig. No. 2 and is called the *Angle of Incidence.*

In a glider it is the angle between the cord of the wing and the cord of the stabilizer extended. (See Fig. 2.) In this case, the cord of the stabilizer is parallel with the top of the stick. Therefore, the angle of incidence is the angle formed by the cord of the wing and the top of the stick. An angle of two or three degrees is customary. In this model two degrees will be sufficient. The degree of angle can be easily measured, for a rise of 1/16th of an inch in four inches gives one degree. Two degrees would be two times this amount.

The cord is only 3 inches instead of 4, therefore a rise of 3/64ths of an inch would equal one degree in this case. Two degrees would be 3/32ths inches. This is slightly less than 1/8th of an inch.

The next problem is to balance the aeroplane properly for flight. The aeroplane should balance in a horizontal position when supported at a point directly under and a little forward of the center of the wing. This point is approximately 40% back from the wing leading edge. Usually a small weight must be attached to the front end of the stick to create the proper balance. This is done after the aeroplane is constructed. Add weight until the ship balances properly.

When your glider has been built to these proportions, it will be ready for flight. Simple flat wing surfaces may be used, without loss of stability. Its *efficiency* will depend upon the *shape* of the surface. If the wing is slightly curved along its cord, it will be more efficient and glide much further than if a flat surface is used. The heighth of this curve above the cord line is called the Camber, Fig. No. 3.

For best results the highest point H of the curve should be approximately 1/3rd of the cord from the leading edge A.

It is wise that beginners build a glider as outlined and test-fly it. Through subsequent practice flights, you will gain valuable information regarding the adjustments and handling of the little plane.

Building The Glider

The wings, stabilizer and fin should be shaped from 1/16" sheet balsa. The wings may be flat or curved by cementing a balsa rib to the middle of the under surface of each pinion. The rib should be curved as shown in Fig. 3. If flat, the upper wing leading and railing edges should be well rounded. The lower edges should be left sharp.

The ribs should be inserted after the wing is dihedraled and cemented to the angle of incidence block Q, Fig. 2, the top of which should be grooved to fit the Vee of the dihedral.

The fuselage stick should be of hard balsa 1/4" wide and 5/16" deep, and tapered on its upper side from the rear of the wing down to 3/16" at the stabilizer leading edge. From this point back the depth should be 3/16" so the stabilizer will be parallel to the bottom of the stick, Fig. 2.

Cement the incidence block Q with the wing and the stabilizer to the stick in their proper place; then cement the fin to the middle of the upper side of the stabilizer, in an upright position. Add the proper amount of weight to the front end of the stick to provide the correct balance (at the C.G.) and your glider is ready for flight.

Gas Lines

(Continued from page 25)

houses the single wheel. This gives the ship a more streamlined appearance. The most remarkable feature is its 3/1000's-thick Alclad sheet covering. This metal sheet is applied over a sheet balsa base that

extends over the entire ship. The finish is very shiny, looking exactly like chrome plate, and is excellent for timing long flights in thermal weather, due to the glint of the sun upon the metal covering when at high altitudes. No riveting was used to complete the job. The weight of the ship originally, without the metal, was 73 ounces and now with the Alclad it is 85 ounces; giving it a wing loading of 19 ounces per square foot. This however does not appear to hinder its flight capacity to a great degree.

Picture No. 5 shows a fine example of craftsmanship. It is a rubber-powered uncovered scale model of a Grumman F3F-1, built by Ed Eaklor, 823 Lincoln St., Denver. The span is 32-7/8 inches, and it embodies full working controls and retractable landing gear mechanism; the latter is made of aluminum tubing rather than balsa. This is a beautiful job.

The benefits derived from the building of models as fine as this will eventually be extremely helpful in the enlarged aircraft program necessary for the defense of this country. All young men who participate in model aeronautics are schooling themselves in the fundamentals of this art which later will prove invaluable in any form of large aircraft work.

An interesting trick was observed at the recent National Competition in Chicago. It requires great skill to cut and trim microfilm and apply it to models. Picture No. 6 shows one of the contestants at work covering his indoor ship, cutting and trimming the 'film with a lighted cigarette. There is little danger of tearing by this method.

One of the smallest airplanes ever built is shown in picture No. 7. It is a Boeing SE-5 built by 14-year-old H. P. Cooper. As you can observe, it is detailed to a fine degree; human hair was used for the guy wires. The span of the ship is only 2-1/2 inches. This was exhibited at the recent Sky-Blazers Contest at the New York World's Fair and placed among the winners.

Picture No. 8 shows an 8 foot soaring glider and a novel launching device made by Bill Salmon of 65 Highview Avenue, Bernardsville, N.J. The launching device was made from bicycle wheels; the tire being removed from one of the three so that it would act as a winding reel for the tow-line. When a flight is made the line is attached to the nose of the glider and the reel is turned with sufficient speed to tow the glider into flight and to the proper altitude. Salmon says that this method has worked very satisfactorily, the glider continually making flights of over one minute in calm air.

One of the outstanding model builders of the Middle West, and in fact the country, is Paul Leiendecker of 2226 Vance Ave., Fort Wayne. Picture No. 9 shows him with some of the trophies he has won. In 1939, at his first contest, in Fort Wayne, with the second gas model he ever built, his official time for one flight was over 30 minutes. In 1940 he opened the season in Dayton by sending a perfectly good ship to "model heaven" for the top place in Class B. Next he repeated his victory of 1939 in the second annual meet at Fort Wayne. With this he won $50, the Junior Chamber of Commerce Trophy, and the Exchange Club's sponsored trip to the Nationals. From the 1940 Nationals, his first, he returned with first place in Class C Senior. After, at Cincinnati, he won third place but lost his best ship on its first flight. To wind up the season he placed first in the recent Akron contest. The flights at the Nationals, Cincinnati and Akron were made with a hand-made motor. Leiendecker is to be congratulated on his remarkable showings.

New Jersey

Contests this fall have taken place one after the other. An interesting one was held on September 22nd at the Pine Valley Airport, New Jersey. Picture No. 10 shows the contestants receiving the rewards of their work. In the center is William Drager of Baltimore, receiving the Class C and High Time awards. The South Jersey Gas Model Aeroplane Association sponsored the event. Fine weather prevailed with a wind welocity of 12 to 18 m.p.h. The 144 entrants provided many thrills with their 429 models. A crowd of about 4500 people watched the show. A special system of weighing and tabulating proved effective and the usually long line of waiting contestants was abolished. One of the honored guests was Mr. Albert L. Lewis, Washington chief of the A.M.A. Twenty-two clubs, from six states, were represented. The trophy for the largest club entered was won by the Philadelphia Gas Model Association with 14 entrants. Drayer's high time was 545 seconds. The progressiveness of this club is indicated by the fact that the 1941 sanctioned contests are already in preparation; first one on April 20th and the second on September 21st. Judges at the meet were: Al Lewis, Ben Shereshaw, B. M. Spotts and Messrs. Coe and Baker. The club holds meetings twice a month, on the first and third Tuesdays at 8 P.M. in the Camden Blvd. Y.M.C.A. Building. It has a membership of over 90. Contest results total sec. for 3 flights, were:

Class C:

Bill Drager, Baltimore, Md. 545
Ray Hooey, Fairlawn, N.J. 411

Walt Eggert, Philadelphia, Pa.................311

Class B:

Mathew Kania, Philadelphia, Pa.............439
J. Leaurendeau, Philadelphia, Pa.............264
Walt Grant, Woodbury, N.J.......................257

Class A:

Ken McElwee, Ashland, N.J.......................336
Rudy Stab, Philadelphia, Pa......................245
Ed. Slobod, Philadelphia, Pa......................188

Stunt Event:

Guy Luongo, Audubon, N.J.
Ray Hooey, Fairlawn, N.J.
Jesse Bieberman, Philadelphia, Pa.

Beauty Event:

Mathew Kania, Philadelphia, Pa.
Adam Deren, Merchantville, N.J.
Oliver Davidson, Baltimore, Md.

Gasoline motor power provides a fine means for flying exact scale models successfully. When rubber power is used on such ships, the design of the plane must be modified in a number of respects to take care of the distribution rather than the concentration of weights, due to the long rubber motor. A gas engine can be installed in a scale model without modification except possibly to increase the dihedral slightly, because the gas engine when installed produces a weight-distribution similar to a big ship. As students of aerodynamics know, weight-distribution has a great deal to do with the stability of planes and the area required in the stabilizer and fin.

One of the finest and most interesting examples of a gas powered scale model is shown in picture No. 11, held by its builder, Frank Hernandez of Audubon, N.J. The exhibition given by Mr. Hernandez with his ship at Trenton's Fourth Annual Eastern States Gas Model Contest was remarkable. This ship took off and flew with the precision of a full scale job. It is powered by a Brownie engine. This contest was held on August 18th at the Mercer Airport, West Trenton and was directed by Martin G. Michlik of the Trenton Model Aircraft Engineers. There were about 150 contestants present with about 180 planes. Ray Hooey of the Silk City Model Club took first place in Class A. Don Rothera of Philadelphia won Class B. Clifford Sommons took first place in Class C with a ship similar to the gas model for which plans are given in this issue.

Colorado

The Denver Gas Model Club is one of the most active in the West. Recently it held a model exhibition, which is shown in picture No. 12. The planes displayed are the work of the members. This Club maintains a model flying field where all builders may fly their ships. Regular meetings are held at which instruction in the theory, design and construction of model planes is given. Contests are held regularly. Frank Corbin Jr. is president. New members are always welcome; they should contact Warren C. Nelson, 3201 W. 44th Avenue, for information.

Illinois

Picture No. 13 shows a group of ten of the club members of the Fox Valley Model Builders' Association of Aurora. They are, left to right, back row: Charles Wickman, Bob Nanzer, Alfred Lippert, James Tangney, Vernon Walters, Herold O'Connor. Front row: Ed Miller, Robert Clark, Ralph Bedford and Harold McGowan.

This particular group has been very active in contests over the country this year; all of them have won prizes. James Tang-

ney, third from right, won 3rd in stick and 7th in fuselage events at the Junior Nationals held at Akron.

This group is sponsored by the Aurora Playground and Recreation Department, who is building a twelve-foot trailer-workshop for contests. You will undoubtedly see a lot of this group over the country in its trailer next year.

Indiana

Following are the results of Third Annual "Little Nationals," gas model contest held by the Northern Indiana Gas Model Association of Gary on September 1st.

Dick Parker, 1105 Oakdale, Ft. Wayne "B" .... 986.3 sec.
(Grand Award Winner)

Class "A"

Chas. Eves, 8146 Langley, Chgo., Ill. "A" .... 435.5 sec.
Chas. Petelka, 7337 Ogden, Lyons, Ill. "A" .... 400.7 sec.
Carl Goldberg, 3554 Leland, Chgo., Ill. "A" .... 307.5 sec.

Class "B"

Robt. Kreigh, 1603 Univ., Columbia, Mo. .... 549.6 sec.
Dick Lyons Jr., 144 N. Park, Liberty, Ill. .... 440.0 sec.
Geo. Petelka, 7337 Ogden, Lyons, Ill. .... 427.6 sec.

Class "C"

Frank Parmenter, 938 Ont., Oak Park, Ill. .... 780.0 sec.
Bill Edlund, 872 Villa, Elgin, Ill. .... 762.9 sec.
Bob Hildebrand, 610 Laurel, Wilmette, Ill. .... 644.0 sec.

Pennsylvania

One of the oldest annual contests held for gas model builders is the Lebanon Meet.

This is the eighth year the contest has been held, under the sponsorship of the local Y.M.C.A. It was directed by Asst. Postmaster Robert J. Light with the aid of Harry Moyer, one of the oldest fans in the game. This contest, though not large, is a classic. There were 57 entries and one record went "by the boards" as Charles Marsh of Ardmore sent his craft on a 14 min. 45 sec. flight. Two ships flew out of sight and were lost. Anyone finding them is requested to notify the Lebanon Y.M.C.A. or bring the planes to the office.

On August 10th the Quaker City Gas Model Association held its regular monthly meet at Northeast Philadelphia Airport. The weather was perfect for flying. There were thirty entries and about twenty other planes not entered. Results were:

Bill Young, West Philadelphia, 2 min. 35 sec.; Loucks Stibgen, Bustleton, 2 min. 20 sec.; Don Rothera, West Phila., 1 min. 54 sec.

The only out-of-sight flight was made by Bill Young; the time was 7 min. and flew about 8 miles.

By placing first in the June meet, second in the July meet and first in the August meet, Bill Young was awarded the Quaker City Consistency Trophy at the Invitation Meet in September.

Louisiana

The Third Annual Gulf States Model Air Meet was held at New Orleans on August 24th and 25th. All told, there were 185 rubber powered models and 155 gasoline ships entered. The entrants ranged in age from 12 through 57 years. A large crowd of spectators was on hand. Results, all times for 3 flight average, were: Osce Jones, Baton Rouge, 2:11-1/3; H. McClyMont, New Orleans, 2:34-2/3; Jack Thomes, New Orleans, 2:17-1/3.

Gas Stunt Event

Morgan Jones, Jackson, Miss; Jack Gee, New Orleans; Sil Thompson, New Orleans.

Flying Scale Model Event

E. O'Donnell, Baton Rouge, 1:20; Roger Jones, Baton Rouge, :51-2/3; Pos. Adams, Mobile, Ala., :44-2/3.

Cabin Endurance Model Event

Ed. Singletary, Meridian, Miss., 3:29; L. L. Wilhite, Pensacola, Fla., 3:17-1/3; R. Smalewood, Mobile, 2:31.

Air Youth Awards

Edward O'Donnell, Baton Rouge, 1:46-2/3; Jas. Carr Jr., Baton Rouge, 1:36-1/3; Osce Jones, 1:29-1/3.

California

The California State Championship Gas Model Airplane Contest was held at Shandin Hills Airport, San Bernardino, on September 22nd. It was sponsored by the San Bernardino Exchange Club.

The Arrowhead Aeronautics Club put on the show. Many trophies, prizes and $85 in cash were given as awards. Flying condi-

tions were excellent and 312 entrants turned out "to do their stuff"; about half of these coming from the Los Angeles area.

Results were, in respective order: Reo Ansai, 519 W. Santa Cruz, San Pedro, 18:23 min., $50, wrist-watch, two trophies and other merchandise. Cliff Probst, Los Angeles, 17 min., $25 cash. Ido Ansai, 13:50 min., $15 cash. Philip Kraft, 12:6 min. Ted Gillett, Hollywood, 10:9 min.

We are grateful to Mr. Frank Knapton for this data.

Alabama

On September 10th Mobile held one of its first model contests. Jacque Houser, secretary of the Mobile Model Aero Club of 55 Semmes Avenue, writes:

"Fine flying weather prevailed but because of an error in the paper the crowd started arriving about ten in the morning instead of in the afternoon. As a result we had to entertain—and dodge—the crowd for a couple of hours longer than we had anticipated. I guess it was all right though in the long run because we sold more drinks, etc. The concession stand is a big help toward defraying the cost of the meet.

"Thermals were around but fortunately only two models flew from sight. One disappeared 'in the blue' after 12:14 and was found about six miles away. We guess that it must have flown about an hour because at the time of the flight the wind was blowing about five miles an hour. The other model lost was a rubber-powered plane that dodged the timers after nine minutes and twenty seconds. This model has not been recovered as yet. The papers and the radio stations have given us announcements, but only the gas model was reported."

Ohio

On September 1 the Frank Lahm Cadets Aero Club of Mansfield held a contest. Flying was from 2 to 5:30 p.m.; the morning being taken up with test flights, weighing-in and checking. Winners were:

Gas Models:	Hi-time	Aver.
Harold Heston	3:26.5	2: 5.3
H. Palmer	1:14	1:07
Ben Gerhart	1:15	:25*
Rubber Powered:		
Carl Ridgeway	1:55	1:10
Bill Fay	1:19	:57
Arthur Kaler	:44	:40
H. L. Glider:		
C. Ridgeway		:35
R. Poth		:30
Bill Fay		:26
Sailplane:		
Ben Gerhart	:26	:25
C. Ridgeway	:22	:17
D. Friddell	:12	:10

Ben Gerhart won the Fox Trophy for high point man.

*Lost on first flight.

Canada

From Canada we hear: "The tenth annual Canadian Nationals was the largest contest ever held in Canada. Over 295 contestants were registered, coming from all parts of this country and the United States. This number is much larger than last year's 250, when it is considered that

no scale model class was included in the 1940 contest.

"The meet was again sponsored by the Canadian National Exhibition as it has been for the past seven years, and held in Toronto, August 26 and 27. The C. N. E. has been the best of sponsors, taking a most active interest in model aeronautical activities in Canada, and throwing its considerable weight behind the National Contest every year, pushing it to ever greater heights.

"The reason for so few new records being established is explained by the fact that most standing Canadian marks were established under higher roofs in the U. S. A. However, Joseph Matulis of Chicago did manage to set a new Canadian high time of 15:29 in the Adult Stick Class. (The Canadian record in this class is 20:37, as set by Tom "Jeff" Harris of Toronto, in Detroit.) The records that took a tumble were the Junior Stick, and the Junior Semi-Scale. The former fell to Lawrence Mark of Toronto, with a time of 12:14, as compared with the old record of some years standing, 10:15, set by Bert Norman of Vancouver. The Semi-Scale record now belongs to David Rosenberg of Montreal, who established this after the contest was over but under official supervision, with a time of 3:14, as compared with 2:37 of Toronto's Jim Templeton.

"The outdoor events were held at the airport of the Toronto Flying Club north of the city, on Tuesday, August 27. Buses transported the contestants to and from this location and the King Edward Hotel, the headquarters for the Nationals. After the good fortune of securing the Gardens for the indoor contest it was inevitable that we should be disappointed. The weather was perhaps the worst that has been experienced at a National Contest for many years. These details from the official records of the Meteorological Department: high temperature 2:15 p.m.—70; clouds—overcast all day; sunshine—a total of 3½ hours for the day: wind velocity at 2:30 p.m.—24 m.p.h.!!!! Need we say more?

"Despite these difficulties, however, many fine flights were turned in. The highest time of the day was that of a gas model under the guidance of Robert L. Dodds of Stratford, Ont. His time of 7:51 in the terrific wind was sufficient to carry off his section of the class. Close on his heels came Donald Lapworth of Detroit, with 6:20. The Adult Gas Event was carried by Fred Smith of Buffalo, N. Y., 3:19, with Ray Hunter of Weston, Ont., second, 2:38. The best time in the rubber powered classes was that of Fred Bower's stick model, 7:19. (Fred was the second place man in the 1939 Wakefield Contest in New York.) The best average of three flights in the Wakefield contest: 3:10, by James Broderick of Chicago, Ill., followed by Roy Nelder, Toronto's ace outdoor builder and the only man who has won the Admiral Moffet Trophy twice.

"Prizes were presented to the contest winners by Mr. Wilson, and the Imperial Oil, Wakefield, and Old Boys' Association Trophies were presented by these organization's representatives. Donald B. Jacobs, the Contest Director, announced that the winner of the "most active girl contestant" award was Dorothy Templeton of Toronto. The National Championship awards were announced and John T. Dilly of Galt, Ont., one of Canada's best-known builders, proved to be the Grand Champion of the Canadian Nationals for 1940.

All American Junior Aviator and Outstanding Model Builder of Meet—Ed Naudzius of Detroit. The Championship Team and winner of Scripps-Howard Trophy was the Balsa Butchers of Cleveland. Winners in the various events were:

Junior-Senior Gas:
Jack Liendecker, Fort Wayne 9:45.4
Dick Donahue, Cincinnati 5:25.8
Ralph Littler, Kalamazoo 4:59.6

Open Gas:
Carl Goldberg, Chicago 14:38
Clayton Thomas, Batavia, N. Y. 9:41
Jerome Furlong, Snyder, N. Y. 6:59

Junior Fuselage:
Albert Blatter, Detroit 5:34.6
Robert Riley, Akron 5:28.2
Robert Szitar, Chagrin Falls 5:05.4

Senior Fuselage:
Owen O'Malley, Cleveland 8:38.2
John Trebich, Cleveland 7:39.5
Frank Pabian, Cleveland 7:24

Open Fuselage:
V. Wallschlager, Cleveland 7:41.4
Edward Naudzius, Detroit 7:25.3
Toful Petraitis, Akron 5:37.6

Original Design:
Bruce Hallock .... Medina
Robert Besse .... Cleveland
Leo Bailey .... Akron
Jim Ryan .... Cleveland

Flying Scale:
Carl Chakmakian .... Dearborn
Ed Petkus .... Cicero
George Hartman .... Morgantown

Speed:
Henry Thomas, Akron .... 65 mi.
Don Orman, Akron .... 54 mi.
Toful Petraitis, Akron .... 52 mi.

Towline Glider:
Phil Weatherwax, Pittsburgh 1:13.2
Jim Ryan, Cleveland Hts. 1:02.2
Paul Hunter, Cleveland .... :58.6

Outdoor Stick:
Jerry Wylemski, Detroit 2:08.8
Bill Wallace, Washington, Pa. 2:07.6
Robert Bruno, Washington, Pa. 1:46.4

Senior Class—Akron Airport, August 29, 1940:
Robert Davis, Clarksburg, W. Va. 3:10.7
Clifton Wieland, Dearborn 3:04.2
Jimmy Tangney, Aurora 2:45.2

Open Class—August 29, 1940:
Russell Shaffer, Ford City, Pa. 3:59
Chester Lanzo, Cleveland 3:40
William Allsopp, Detroit 3:35.6

New York

As a climax to the outdoor season, the National Aero Reserves Grand Contest was held at the Albany Airport on September 22. A high wind prevailed but this did not prevent many fine flights being made.

Herb Greenberg of Hartford won the Open Cabin Event with an average flight time of 1:32.5, and was awarded the Airplane Pilots League Trophy. Richard Barber of Utica was second with 1:21.1 and Albert Reed, Schenectady, was third with 1:17.3. The Senior Stick Event winner was Jack Rice of Hartford with an

average of 2:7.3. Placing second by a difference of only one second was Stanley Ryczek of Utica. He won a year's subscription to MODEL AIRPLANE NEWS. Everett Pandolfi of New Britain, Conn., placed first in the Senior Cabin Event, winning the American Airlines Trophy. His flight average was 1:55.4. George DeLaMater, Oneonta, was second with 1:39. The Junior Stick Event went to Robert Flood, Schenectady, whose flight average was 1:20.3. Sebastian Gianni, with 1:3.5, was second. Raymond Brezzo of Hartford, with an average of 34.8 seconds, won the Junior Cabin Event and Clovis Wischmeyer of Rochester was second with 33.3 seconds. The best individual flight of the day was turned in by Stanley Ryczek, whose stick model stayed aloft for 4 min. 48.6 seconds.

The contest was supervised by Lt. Comm. Russell Holderman. Up to recently Lt. John L. Scherer was Director but now he is a member of the Royal Canadian Air Force, having joined recently.

Air Youth

A book which will be of interest to contest directors and many model builders, entitled "Model Airplane Contests: An Air Youth Guide," has been published by Air Youth of America. It presents full information on how to plan and conduct all types of model airplane contests, games and novelty demonstrations. It also contains the complete National Competition rules, as well as illustrations, charts and diagrams.

A school for leaders of junior aviation clubs and groups was established on October 9. The school will feature practical "how to do it" methods in model building and junior aviation activities. Mr. Arthur Vhay, Air Youth's technical director, will be in charge. Meetings will be on six successive Wednesday evenings.

Flash News

(Continued from page 34)

West Point, N.Y., and crashed into the water. The ship disintegrated under the impact and Lieut. M. F. Stunkard, Lieut. B. C. Rose, Lieut. J. E. Barzynski, Sgt. A. T. Yancey and Sgt. E. R. Burdick, all members of Mitchell Field's 97th Observation Squadron, were forced to swim for 30 minutes before rescue craft arrived.

First of 29 planes of all types, two huge Boeing B-17B four-motored bombers arrived in Anchorage, Alaska, where they will augment the army air corps' expanding air base establishment there. Pursuit, bombing and transport ships will follow as will

2400 additional men.

Tucson, Arizona, will be the sight of the air corps' newest air base, according to recently announced plans of the War Department. With $1,250,000 worth of hanger construction and field leveling under way, the First Bombardment Wing, the 41st Bombardment Group and the 31st Air Base Group including 270 officers and 1800 enlisted men, and service units comprising 50 officers and 1200 enlisted men will be located at the station as soon as facilities are available.

NAVY.—Statements have been made by government officials to the effect that the navy's procurement program was nearing the completion stage of contract allotment.

This may be true, however, certainly little, if nothing, has been made available to the press. As FLASH NEWS stated last month, Admiral Jack Towers feels that there are no worthy designs fit for navy contracts, which may or may not be true. One order, however, has been brought to light; that for 72 Douglas SBD-1 two-seat scout-bombers at a cost of $3,252,870. This ship is little more than a slightly modified Northrop BT-1; the 36 of which they now have in service have not pleased the navy any too well. FLASH NEWS believes that manufacturers are shying from navy contracts for several reasons, chief of which is the navy's tight inspection, specification and rejection crews which throng the plants of naval contractors during plane construction. Capacity over-time, backlog and unrestricted profit on foreign orders are others.

Hailed by Rear Admiral John H. Towers, Chief of Naval Aviation, as the "fastest plane in the U.S.," the Vought-Sikorsky XF4U-1 single-seat navy fighter (MODEL AIRPLANE NEWS, October, 1940 issue) is being put through acceptance tests at N.A.S. Anacostia. With a top speed of "better than 400 miles per hour" this title is somewhat ambiguous in the light of the Lockheed P-38's 500 m.p.h., and the Curtiss P-40's 430 m.p.h.

The U.S.S. Ranger took first place in the five-inch battery competition among aircraft carriers in the navy's recent gunnery tests for the year ending June 30. The Ranger is now entitled to the white "E" prized by navy ships. The aircraft carrier U.S.S. Yorktown was involved in a hush-hush collision with the Shark, flagship of Submarine Division 13 while on maneuvers in Hawaiian waters. Only minor damage was suffered by the carrier and submarine.

Brig. Gen. Ross E. Rowell, C.O. of the marine corps' aviation division, states that "dive-bombing is more than 13 years old; for on July 16th, 1927, I commanded a flight of five D.H.-4 in Nicaragua which attacked a garrison of 600 Sandinistas at Ocotal, 120 miles from the airbase at Managua. We dived on them from 800 feet and dropped 17-pound fragmentation bombs while still vertical. In addition we machine-gunned them with fixed Browning guns on the cowling." This is a far cry, however, from the 500 pound missiles of destruction dropped by Germany's Junkers JU-87B "Stukas." Incidentally, did you know that the word "Stuka" is a contraction of sturzkampfflugzeug? It is coined from the first three letters of sturz (dive) and the first two letters of kampf (fight). Correct pronunciation: SHTOO-kah!

MANUFACTURING. — Cataline Airline, Ltd., has ordered two LOCKHEED "Lodestar" transports at a cost of $170,000. These will be used over the new landplane route to the famed Southern California island from Union Air Terminal, Burbank to a new field, now nearing completion at Buffalo Springs, high in the mountains of the tiny island.

FORD MOTOR COMPANY, of Detroit, will build 4,000 Pratt & Whitney double-row Wasp engines for the United States Army and Navy, it is announced officially. This will not interfere with Henry Ford's plans to design and build his own aircraft engine in the near future.

ALUMINUM CORPORATION of America's first northwest plant has gone into operation near Vancouver, Washington. Power from the federal power dam at Bonneville on the Columbia River will provide electricity to produce sixty million pounds of aluminum per year. Use: the West's giant aircraft industry!

NORTHROP Aircraft celebrated its first anniversary with a flag-raising ceremony recently. Production is gaining on the scout-bombers for the British Purchasing Mission. Originally ordered by Norway, the order has been tripled and all will be put in service by the R.A.F.

DOUGLAS Aircraft will build the huge order for A-20A air corps attack-bombers at the new Long Beach Division, some 30 miles south of the main Santa Monica plant. Six houses at the west end of the Santa Monica field have been torn down to make room for the take-off of the giant XB-19 four-motored bomber (MODEL AIRPLANE NEWS, Nov., 1940 issue) scheduled for the middle of December. Present backlog: $400,000,000!

LOCKHEED has consolidated construction on the P-38 Interceptor under one roof by the construction of six new units to the main Burbank plant and the abandonment of the Saugus plant in which the P-38's were being assembled. With more than 800 of the world's fastest airplanes on order for England, and more than 700 for Uncle Sam, Lockheed's present backlog stands at $211,500,000.

NORTH AMERICAN'S new plant at Grand Prairie, Texas (between Fort Worth and Dallas) is in the foundation stage and executives have been announced. A. T. Burton has been named Divisional Manager, James Rivers, factory manager; and Kenneth Bowen, production manager, all of the Inglewood office. It is expected that Robert C. Morrison, long associated with MODEL AIRPLANE NEWS, will assume leadership of the Service Engineering Group in the new plant. N.A.A.'s present backlog: $225,000,000!

CURTISS' new XSB2C-1 dive-bomber is rapidly nearing completion in the Buffalo (N.Y.) plant and will be turned over to the navy for tests upon completion. Of the mid-wing two-seat single-engine type, it is powered by the huge 1,700 horsepower Wright Cyclone 14, double-row radial engine. Curtiss-Wright's manufacturing (airplane) division has a backlog (mostly P-40's for the U. S. Air Corps and the Royal Air Force) of $550,000,000, biggest in the industry!


Complete WITH MOTOR
14.95
MOTOR, WHEELS, PROPELLER, FLIGHT TIMER AND KIT
95
AIRPLANE KIT
Less Wheels
Propeller
NAA 292
RITE-PITCH PROPELL
MEGOW'S New Gas-Powered
Aero Champ
and the
Megow "199" MO
New MEGOW
"199" MOTOR $12.50
(WITH COIL AND CONDENSER)
Bore and Stroke, ⅝". H.P. 1/7. R.P.M. Max. 10,000. Disp. .199. Weight, 3½ ounces. Block tested.
CYLINDER. Turned from solid chrome Vanadium steel, honed and lapped to .0001". Cadmium plated.
PISTON. Machined and precision-ground from special centrifugal cast iron.
TIMER. Fully enclosed, with special fulcrum type arm and auxiliary spring. Points finest ground and polished tungsten.
CRANKCASE. Special aluminum alloy. Permanently sealed. Extra long special high-speed bronze bearing.
• Motor operated equally well upright or inverted. Visible type gas tank. Oversize fins for efficient cooling. Most efficient coil and condenser obtainable.
Now! A gas model airplane
a motor . . . Megow's new "199"!
SEND 10
FOR BIG, NE
132-Page Catal
of Model Airplan
Railroads and
Ships
Megow
PHILADELPHIA, PA.